AMERICAN Railroad Journal

·ESTABLISHED·1831·

Railroads, Tramways, Finance, New Inventions, Machinery.

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Railroad Notes.

WE invite railroad officers to send us notice of elections, transfers, appointments, resignations, etc.; and all our readers would oblige us by furnishing us with any items of news which may come to their knowledge and are of a suitable nature for our columns. It is our intention to publish monthly full and accurate information regarding those enterprises and industries to which the AMERICAN RAILROAD JOURNAL is devoted, and to effect this end we solicit the coöperation of readers interested therein. We aim specially to record all new railway enterprises in the United States and Canada, and to note the progress of construction on all new roads and extensions; and we request those concerned in railway building to give us early information concerning the above, that our reports may be as complete as possible.

HANDS in several of the Pennsylvania Railroad Company's shops at Altoona have been ordered to work until 10 o'clock at night, owing to a press of orders.

BIDS for the construction of the roadway of the South Pennsylvania Railroad were handed in on the 15th inst., at Harrisburg. Beyond the statement that many of them are at least 30 per cent. lower than work of the same character has heretofore been done, nothing is known. There are about 200 bids.

ON November 1, arrangements were made by which the Adams and the Southern Express Companies will hereafter conduct the express business over all the lines controlled by the Shenandoah Valley and the Norfolk and Western Railroad Companies. The roads now operated by the Norfolk and Western between Norfolk, Va., and Bristol, Tenn., a distance of 408 miles, were the first to inaugurate what is known as the Railroad Express. This was directly after the close of the war.

THE laying of the track of the Williamstown Railroad extension from Williamstown to Grassboro, N. J., was completed on the 13th inst. The work of ballasting will begin at once, and the road put in a condition to receive trains before 1st of December.

THE eighth annual convention of Railroad Passenger and Freight Conductors' Mutual Aid and Beneficial Association, was held at Chicago on the 14th inst. The receipts of the association during the past year were $40,000, and the disbursements on account of deaths and disabilities, $45,000. The present membership numbers 1,467. Twenty-one deaths occurred during the year.

THE committee of the bondholders of the Danville, Olney and Ohio River Railway, which road has been in the hands of a receiver for some time, has just completed a tour of inspection over the line. The committee reports that the property is in good condition; that the management of Receiver Howard is commendable; that the deficit of earnings, as compared with operating expenses, is less than the committee expected to find, considering the condition of the property, and that the management of the past nine months is fully indorsed.—*Boston Daily Advertiser.*

MR. D. B. ROBINSON is to assume the position of general manager of the Mexican Central Railroad. His headquarters will be at the City of Mexico. Mr. Robinson is positive that the entire line will be completed by the 1st of April next, and that a large trade will be developed. He also stated that a short time ago four miles of track was laid on the Mexican Central road in ten hours.

THE Greeley (Col.) *Tribune*, in an article concerning the proposed railroad known as the United States Central Railroad, has the following as to the location of the road. The objects and purposes for which this company is formed and incorporated are to construct and operate a railroad from the city of Denver, across the State of Colorado, the Territory of Utah and the States of Nevada and California to the city of San Francisco, and also branch lines to Leadville, Colorado, Milford and the Iron Springs, in Utah; and also to Crystal Springs, Pahrangat valley, near Hyko, in the county of Lincoln, Nevada, via Stone's Ferry, on the Colorado River, to a junction with the Atlantic and Pacific Railroad in the Territory of Arizona, a distance of 160 miles; also from a point on the main line near Gilroy, in Santa Clara county, California, to the eastern side of San Francisco bay, Alameda county, in California, a distance of eighty miles. The estimated length of the line is 1,200 miles, with 300 miles of branches.

COMPARATIVE statement of earnings and expenses of the Rome, Watertown and Ogdensburg Railroad Company for September: 1883, receipts, $172,848.15; operating expenses, $94,844.08; net earnings, $78,004.07; 1882, receipts, $188,307.19; operating expenses, $114,629.42; net earnings, $73,677.77; increase in net earnings for 1883, $4,326.30.

THE pay-roll of the Pennsylvania Railroad Company's shops at Altoona amounted to $215,000 last month. The company has given orders for 1,000 gondola cars, to be used in the Clearfield coal region.

THE engineers of the Schuylkill Valley Railroad have reached Hamburg. It is believed that the trains over the new line will be running into Reading by the 1st of September, 1884.

THE two rail mills at Scranton have made 10,000 tons of steel rails for the New York, West Shore and Buffalo Railroad Company.

THE last gap in the track of the West Shore Road, between New York and Buffalo has been closed, and the line is now completed between these cities. The trains will be running between New York and Buffalo on December 15. The track is in fine condition between Syracuse and Buffalo.

THE St. Louis, Iron Mountain and Southern Railroad Company has asked the New York Stock Exchange to strike from the regular stock and bond list its entire issue of second preferred income bonds, amounting to $4,015,720. The said bonds have been retired, and the officers of the company state that steps are being taken to have the mortgage which was issued to secure them canceled.

THE Long Beach Railroad Company has completed the purchase of the Tuckerton Railroad, which runs from Tuckerton, about fifteen miles from Atlantic City, to Whitings. The terms of the purchase have not been made public. The road is a small one, and at present barely pays expenses. The Long Beach Railroad is a corporation under the control of the Pennsylvania Railroad, and is designed to run down the entire length of Long Beach from Barnegat City to Absecom. A branch will be built from Tuckerton to Absecom to connect with the Camden and Atlantic Railroad, thus furnishing direct communication to New York for all the cities on the New Jersey coast from Atlantic City north. It is intended that the road shall be completed and ready for service by the 1st of June next.

BOSTON, Nov. 13.—The annual report of the Boston and Lowell Railroad for 1883, shows that the gross earnings were $2,127,304, and the operating expenses $1,812,565, and the net revenue $248,178. The funded debt is $3,546,400, and the floating debt $765,000. Samuel L. Aldrich was elected president of the Central Massachusetts Railroad, and G. F. Seymour, secretary and treasurer.

E. G. ALLEN, superintendent of the Massachusetts Central Railroad, has been appointed general superintendent of the Ohio River Railroad, with headquarters at Parkersburg, West Va.

THE September statement of the Union Pacific Railroad Company shows that the gross earnings for the month were $2,994,076, a decrease from the corresponding month last year of $176,239; expenses, $1,535,188, an increase of $274,596; surplus earnings, $1,458,888, a decrease of $450,835. The decrease in the earnings was due primarily to the extension of the Chicago, Burlington and Quincy to Denver, and also to a decrease in Colorado business. The gross earnings for October show a decrease of $50,000. According to approximate figures, the earnings of the first week in November show an increase of more than $70,000 over those of the same week last year.

A SYNDICATE of railway capitalists at Baltimore has bought the franchise and property of the Washington City, Cincinnati and St. Louis Railroad Company. The project is to build a road from Linwood, Va., a point on the Shenandoah Valley road, to Harrisonburg, and thence westward about one hundred miles, through the Dora coal mines in Pocahontas and Webster counties.

IT is probable that the opening of the New Orleans and Mississippi Valley Railroad will be postponed until about the 1st of December, as the Jackson press property will have to be turned into freight sheds, etc., before the road is ready to handle traffic. Aside from this, no depots have as yet been erected along the line between New Orleans and Baton Rouge and no platforms at the flag stations.—*Times-Democrat.*

AS THE efforts of the Illinois Central Railroad to purchase the Mississippi and Tennessee road did not succeed, it is now stated that the Illinois Central will build a line from Memphis to Jackson, Tenn., at an early day, as such a road is something which the Illinois Central system has long needed.

SHAWANO County, Wis., has granted one year's extension to the St. Paul Eastern Grand Trunk Railway Company, for completing its line through the county. The extension involves the right to about 100,000 acres of land, given in aid of the road, nearly all of which is now in the hands of New York capitalists.

THE Georgia Pacific Railroad was completed to Birmingham on the 12th inst., and regular trains between that place and Atlanta will be at once put on the road.

THE Philadelphia and Reading Railroad has contributed $5,000 for the relief of the sufferers by the Shenandoah fire, and will transport all supplies to that place free of cost.

IT is officially announced that the negotiations for the Canadian Pacific Railway guarantee have been completed at Ottawa, and that the agreement has been duly executed.

THE Delaware, Lackawanna and Western Railroad has decided to extend its coal business, and will soon begin work on some immense coal-bunkers to be built at South Chicago. The company propose to establish a line of large steam barges, to be run from Buffalo to Chicago, thus securing to the company an entire line of transportation from the coal fields to the West.

THE earnings of the St. Louis and San Francisco Railway for the first week of November, were $87,000; in 1882, $77,700; increase, $9,300; since January 1, $3,170,300; in 1882, $2,928,700; increase, $181,600.

THE record of railway construction for the week ending Nov. 10, aggregated 91 miles, a total for 1883, thus far, of 5,279, against 8,731 in 1882.

SAN ANTONIO, Nov. 13.—It is reported that Col. Huntington will stop work on the Sunset Mexican extension on the completion of the 250th kilometer, which will be about Jan. 1. The men will then be brought over to complete the work in Texas.

TROY, N. Y., Nov. 14.—A citizens' meeting was held at Ticonderoga, Essex county, on Nov. 14, to consider the proposed extension of the Vermont Central Railroad across Lake Champlain to Ticonderoga. A committee was appointed to confer with the directors. The prospects are favorable to the extension.

THE annual meeting of the stockholders of the Valley Railroad was held at Staunton, Va., on the 15th inst. Samuel Spencer was reëlected president, together with the old board of directors. The reports received showed a very encouraging prospect for the road. The completion of the line to Lexington has opened up a fine business, and the question of further extension will soon be agitated. It is designed eventually to make this a grand trunk line to the South, and the proposed route penetrates a country rich in minerals and timber, assuring a large local traffic.

THE Ridgeway and Clearfield Railroad, extending from Ridgeway, on the Philadelphia and Erie Railroad, to Brockwayville in the heart of the coal fields, now operated by the New York, Lake Erie and Western Railroad Company, a distance of nineteen and a half miles, was opened for business on Nov. 19, and will be operated as part of the Middle Division of the Philadelphia and Erie Railroad. When completed the road will be twenty-seven miles long, and will reach a point on the low grade division of the Allegheny Valley Railroad.

THE annual meeting of the stockholders of the Rochester and Pittsburgh Railroad Company was held in New York on the 14th inst., and the following board of directors was chosen: Henry Day, Augustus Kountze, Andrew Pierce, A. L. Hopkins, Frederick D. Tappen, Frederick A. Brown, Wheeler H. Peckham, George W. Parsons, George D. Morgan, Walston H. Brown, John H. Hall, Adrian Iselin, Jr., and George F. Stone. A report of the condition of the road, financial and otherwise, was made by the president, Walston H. Brown. The gross earnings last year were $543,639.86, and the operating expenses $422,032.27, leaving net earnings of $121,607.59. These figures were based on the operation of 125 miles of road. The following charges against the net earnings were reported: Interest on bonds, $87,900; interest on car trust, $11,643.29; interest on Perry bonds, $1,400; interest on balances, $10,155.01; paid on account of Rasselas accident, $40,000; taxes, insurance, etc., $21,000.86; total, $172,099.16, showing a deficit of $50,491.57. President Brown recommended the purchase of some additional rolling stock.

IT is rumored that the Grand Trunk proposes to move for a lease of the Fitchburg and the Hoosac Tunnel and Western lines, in order to secure another line to Boston, in connection with the new West Shore Road, a lease of which, it is believed, has been virtually arranged, thus securing an independent line from Chicago to New York. A conference of directors of the Grand Trunk and Boston and Lowell was had on the 14th inst., in Boston, to consider the informal proposition of the former to lease the latter. The matter was discussed at length, but no agreement for a lease was reached, nor was any formal proposition for one accepted. The Central Vermont is supposed to be interested with the Grand Trunk in the proposed lease.

THE annual report of the New York, New Haven and Hartford Railroad Company shows a total income last year of $6,729,374; total expenses, $4,705,346; net income, $2,024,028; surplus for the year, $33,188; passengers carried, 7,079,168; tons of freight carried, 2,160,023; total cash assets, $4,019,868; total debt, $2,566,323.

Interesting Tests of Brakes.

FOLLOWING is a careful and complete record of tests recently made, of the brakes manufactured by the American Brake Company, of St. Louis. They were made at the request and under the supervision of Mr. S. W. Robinson, professor of mechanical engineering, Ohio State University, upon the White River branch of the St. Louis and San Francisco Railway, between Springfield and Galloway, on Monday, October 29, 1883.

FIRST TEST. TRAIN EMPTY.

Engine and tender, equipped with our steam driver and tender brakes.
Twelve coal cars, equipped with our improved automatic brakes.
One caboose, equipped.
Total weight of train, 164 tons. Length, 429 feet.

Number stops.	Speed in miles per hour.	Time in seconds.	Distance in feet.	Grade in feet per mile.
1	23	35	612	26 Down.
2	20	32	503	52.8 Down.
3	23	47	1090	79.2 Down.
4	26	41	1108	79.2 Down.
5	24	29	758	*a*31.7 Down.
6	23	27	552	26.4 Down.
7	24	23	468	26.4 Down.
8	18	21	475	*b*52.8 Down.
9	19¾	15	175	*b*13 Down.
10	25	50	1050	*c*42.2 Down.
11	24	20	380	*d*52.8 Down.

a After stop, locking pawls were adjusted.
b Backing and allowing momentum to apply brakes.
c Backing. Time and distance taken from moment engineer first shut off steam and includes all operations of the stop. (See note below.)
d Engine detached at speed. Hand-brake set on three forward cars. Time taken when pin was pulled.

NOTE.—In making a backing stop, when the desired speed is attained, the engineer shuts off steam and applies steam driver brake to draw the "slack" out of the train, then releases the steam brake, and allows the momentum to apply the automatic brake.

	Speed.	Time.	Feet.	Grade.
Average of all stops	22¾	31	652	44
Average of ordinary forward stops.	23⅓	38	727	46

SECOND TEST. TRAIN PARTLY LOADED.

Engine and tender.
Twelve empty coal cars, equipped with automatics.
Three loaded coal cars, not equipped with automatics.
Two loaded box cars, not equipped with automatics.
One caboose, not equipped with automatics
Total weight of train, 281¼ tons. Total length, 585 feet.
(Loaded cars were interposed with empty cars.)

Number stops.	Speed in miles per hour.	Time in seconds.	Distance in feet.	Grade in feet per mile.
1	16	30	394	43 Down.
2	28	30	437	52.8 Down.
3	22½	35	408	37 Down.

	Speed.	Time.	Feet.	Grade.
Average	22	32	413	44

Speed taken from speed recorder.
Distances measured.
Grade taken from chief engineer's survey and profile.

Monthly Railroad Returns.

[All the companies are invited to send us a copy of each monthly report of earnings, etc., for insertion under this head.]

CHESAPEAKE AND OHIO.—Estimated gross earnings, month of October, 1883, $362,766.96; October, 1882, $351,309.96; increase, $11,457.00. Earnings, January 1 to October 31, 1883, $3,242,053.50; same months, 1882, $2,780,889.05; increase, $461,164.45.

ELIZABETHTOWN, LEXINGTON AND BIG SANDY.—Estimated gross earnings, October, 1883, $68,090.65; October, 1882, $58,288.81; increase, $9,801.84. Earnings, January 1 to October 31, 1883, $600,917.33; same months, 1882, $421,040.17; increase, $179,877.16.

NEW YORK AND NEW ENGLAND.—Estimated total receipts, October, 1883, $346,239.99; October, 1882, $297,030.15; increase, $49,209.84

ILLINOIS CENTRAL.—Estimated earnings, traffic department, October, 1883, $1,397,422; October, 1882, $1,311,678.79; 1,516 07-100 acres sold during the month for $7,149.44; collections during the month, $11,035.79.

MRS. JOHN W. GARRETT, wife of the president of the Baltimore and Ohio Railroad Company, died on the 15th inst., at Montebello (Mr. Garrett's country seat), near Baltimore, from injuries received October 11.

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ENGLISH AND AMERICAN CARS.

LIKE all other good things, a commendable pride in our nation and its institutions is open to abuse, and unquestionably there is a great deal of truth in what a correspondent writes us as to the prejudice and unfairness of many American critics on the British railroad system, in some of its features. His communication is too long for insertion in these columns, but a brief review of certain of his observations may be found both interesting and of service. He reflects with considerable spirit and some indignation, on those observations in American newspapers, which surely follow the account of an assault or murder in an English railway carriage, such remarks, so he alleges, invariably taking the form of a comparison intended to show the amazing superiority of our compartmentless car over the usual build of the British carriage, and a lecture to our cousins across the water, scolding them because, forsooth! they do not hasten to admit this assumed superiority. Moreover, he is quite unwilling to admit that a monopoly of practical good sense is owned by the railroad men of the American continent, and takes the position that, the differing conditions of travel being regarded, the British coach is preferable to ours for use in a thickly populated country, like England; while our car may be the best for use here. He claims simply that British railway companies are just as likely to know what is proper in the matter of carriage construction suitable for their country people, and the conditions of the national life, and to provide it, as American companies to make their preference of the manner in which cars are shaped for the accommodation of the American public. This broad principle is so reasonable, that we think no reader of reflection will be found to gainsay it; and as the policy of the AMERICAN RAILROAD JOURNAL is and always has been liberal and widely representative, we have no objection, but rather find pleasure, in giving prominence to a position or two which our British critic on critics pleases to send us.

He asserts that in England, where trains must necessarily let off and take on passengers at distances which are always short as compared with those on American roads, the compartment system, with its many doors opening level with the station platform, is simply the best device practicable for the rapid discharge and reception of persons traveling; and that our plan of compelling exit and ingress by the front and back of the car and down a staircase to the roadway would, if generally followed in England, greatly impair the undoubted efficiency of the service as to rapid time, particularly when stops at short distances are made. Moreover, this presumptuous Britisher goes so far as to prophesy that the time may come in the history of American railway development, when to follow the English compartment plan will become

a necessity even here. This is turning the tables on us with a vengeance, modified, it is true, in some degree by the presumption that our population may become as dense as that of the "old country." Then our correspondent claims also, that the average English railway carriage, instead of giving less freedom to the passenger than the average American car, actually gives more, for the cramped position enforced upon the unfortunate victim of the two-to-a-seat arrangement of this, is vastly a more uncomfortable restraint than can possibly be imposed on the passenger in the fullest English train, in which even the cheapest seats conform as to shape, to the human form divine, are upholstered, and never necessitate uncomfortable crowding. Attempting the facetious, our redoubtable Briton traces the invention of the American "duster" to the form of our cars which, he says, is the best possible provision for filling them with dust and soot, while the happy English traveler escapes this infliction, or nearly so, by the provision of side doors to the coaches. Besides, he thinks the outrages occasionally committed on British railways by a ruffian alone with an inoffensive passenger in a compartment of a train, are more than set off by what he reads of railroad robberies in the West, where a gang of well-armed highwaymen "go through" a whole train, taking all the money and valuables in it, and murdering whoever withstands their rapacious will. They would not find it practicable to deal so with a train of carriages with compartments.

In short, our critic puts his points so well and forcibly, as to suggest the reflection, that the assurance of American journalism may not be beyond the possibility of erring in opinion from want of information, and from a narrow and self-conceited preference for things American, simply because they are American.

THE news columns contain an article entitled "A Railway Mission Car," which will be read with interest. Whatever the individual religious opinions of readers, they are surely at one in the encouragement of what promises to secure the moral improvement of men, by whatever means. Believing this firmly, we do not hesitate to announce in this conspicuous place, that the promoters of the mission car scheme will receive a certificate of incorporation from the Commonwealth of Massachusetts, as soon as arrangements necessary for this purpose have been made.

MR. WM. FALLON, of Newburgh, New York, has invented a new dump car, a model of which has been recently on view at this office. It can be used as either a flat or grain car. The inventor has great faith in his improvement, which we think to be sufficiently interesting to railroad men to justify this special mention and the promise that our next number shall contain an illustrated article describing it.

Our Railways and our Industries.

OUR country has reached one of those stages of development where it is necessary to stand still and await the arrival of the developing forces which underlie industrial and commercial activity. On all sides there are indications of over production. On every hand, merchants and manufactures are on the alert for wider and more abundant markets. Railway builders are impatient at the seeming completion of railway construction. Capitalists and investors find the avenues and opportunities for investment less numerous, and less inviting than a year or two ago. Rates of interest are declining, and the volume of capital seeking investment is larger. Competition is becoming more and more intense, profits narrower, and the great field for the investment of capital, and the exhibition of enterprise is being filled up. The period of activity now apparently drawing to a close, has lasted five years. During that time, according to statistics, the productive capacity of the country has been more than doubled; the railway mileage has been increased one-half; banking facilities have been wonderfully expanded; telegraph lines have been doubled in length; 3,000,000 have been added to our population, and our industrial activity has sought out scores of new fields for exercise, and has given an impulse to ingenuity and invention and skill, such as has been known in no other country or time. We seem to have reached a halting point in our progress; but the elements at work are gathering themselves together for a new advance. Cost of production is declining, and the cost of construction is correspondingly less; $50,000 in 1883 will, in some respects, do as much as $100,000 ten years ago. Competition, which is such a powerful factor at the present time, is due to the increase of capacity and the lessened cost of production and operation, in all the multitudinous avenues of activity. There are those who look with apprehension to the contraction of business and decline of railway construction, from the causes above given, as well as to a falling off in manufacturing activity, and in general, a period of greater or less inaction as a result of what they think has been an undue expansion of capacities. It is not to be wondered at that this view obtains in some quarters. Our progress has been phenomenal; but a careful investigation into the causes which control the nation's growth, shows conclusively that, instead of entering upon a career of comparative inactivity, the country is only entering a field wherein its enormous producing powers and half developed energies will find greater opportunities than they have yet enjoyed.

The strong factors in the problem of the future are, first, the volume of capital seeking investment, and second, the masses seeking employment. Neither can remain idle. The earning power of our railway system will, in a few years, be sufficient to practically wipe out the bonded indebtedness contracted at a high rate of interest. During the five years from 1873 to 1878, bankruptcy and failures wiped out a large portion of the indebtedness which had been accumulating for the five years previous; and in the past five years the profits of business have, in addition to paying the nation's way, canceled much of the indebtedness contracted during that period. The agencies which have been at work during the past ten years, both favorable and unfavorable, have resulted in the clearing up of a vast volume of indebtedness, and in put-

ting into operation a multitude of agencies which have stimulated enterprise, decreased the cost of production, and, in a word, made the productive power of the country greater than the present consumptive capacity. It is this mighty power, this volume of potential energy, which is mistaken for evidences of weakness. It is this wonderful capacity to do and to make, which has led the world to regard the present over production as an unfavorable omen or condition. The reverse is the truth. The only thing now wanted is for the consuming capacity to overtake this mighty producing power, and it is doing so every month and every day. A few months will make a transition of the great factors on both sides, and instead of the backwardness and fear now apparent, there will be confidence, energy, and greater activity. The capacity that is now creeping along on its hands and knees, so to speak, will be invested boldly in new enterprises. These general considerations can be expanded, and proofs can be enumerated to show that the prospects of the country for the next five years are more favorable than at any other time in our history.

The decline in the price of railway material, chiefly steel rails, has not developed a corresponding demand. The managers of the Bessemer Steel Rail Mills, with their thirty-eight converters, and a productive capacity of upwards of 2,000,000 tons per annum, are now considering the policy of restricting output and reducing wages. Orders come in slowly. The projection of new roads is heard of less frequently; most of the roads inaugurated a year ago are completed, and the shops and establishments engaged in the work of providing equipments and appliances are busily engaged in completing numerous orders for rolling-stock, motive power, etc. The next six months will be marked by unusual activity in this direction. The volume of traffic is increasing; investors in railway securities desire returns before risking further investments. The construction of 6,000 miles of road this year as compared to 12,000 last year, may look like a great falling off, but the present increase in traffic, the steady dividends, and the general increase in the earning capacity; the settlement of the great West and South; the influx of armies of foreigners; ease in the money market; all these, and a score of other and lesser influences, point to the strong probability of another revival in railway construction as soon as the present capital invested is firmly fixed in its earning power. This is an age of railroads 100 miles apart, so to speak. We shall soon enter an era when railroads will be fifty, twenty, and then ten miles apart, and that day is not so far distant as might be supposed. If the country from ten to twenty miles each side of a line is able to support it and yield satisfactory dividends, another road will soon be projected on the borders of this producing area, and lead to the construction of similar lines. Steel rails have declined, in a comparatively short time, from $55 to $35 per ton. Rolling-stock and motive power have similarly declined in cost. Most of the locomotive building works have orders from three to eight months ahead. Larger engines, and cars of greater capacity are being ordered. The cost of transportation has greatly declined per ton per mile, while the earning power of our railway system has not materially declined. The addition of three trunk lines between the seaboard and Chicago has, for the time being, checked the desire to build more fresh lines through the same territory; but the rapid building up of the northwest is likely to stimulate enterprise in that direction. A large amount of railway construction is projected in Michigan, Wisconsin, Iowa, Minnesota and Dakota. That section of the country is rapidly filling up, chiefly with foreign population of hardy workers, whose labor is forming the basis for a further expansion of railway construction, and the development of greater traffic.

Throughout the Southern States, a similar spirit of enterprise is leading to the construction of long and short lines, most of them, however, for the development of local traffic in mineral, lumber and agricultural regions. The capital which has been invested in the South has yielded very large returns, and every opportunity is now being seized which promises even moderate returns. Land has been bought for speculative purposes, and for development, and a multitude of new enterprises has taken root there which will develop results within the next twelve months. A recent estimate shows the railway construction contemplated south of the Ohio, and east of the Mississippi Rivers, at about 3,000 miles. Most of this will, no doubt, be so constructed, although this depends upon several contingencies. West of the Mississippi, a number of enterprises are under way, and before they are completed, it is probable that they will give rise to greater activity in the work of constructing shorter lines, for the development of mineral lands. Foreign capital is fully aroused to the advantages of investments in this section. The opening up of the Mexican Republic to capital and labor is affording a wide field for the smaller investors and manufacturers, and commercial agents who find in the great southwest a field full of great promise for future harvests.

The tariff question, the questions of internal revenue, national bankruptcy law, and the building up of a merchant marine, together with the development of our export trade, are a few of the leading questions which promise to occupy the attention of legislative, industrial and commercial minds for the next five or ten years. We must have a larger export trade, and the necessity for it is recognized on all sides. The Central and South American States are regarded as our own proper field; foreign factors have held possession, not because of any superiority in method or products, but because of the negligence and indifference upon the part of Americans. Capital is now seriously considering the project of building ships to take advantage of the opportunities looming up; but deficient legislation, and the absence of legislation which would virtually secure such investments, is holding much capital and much enterprise in check. In a few years it is probable that we shall have ship-yards able to compete with the Clyde. For the present, our progress must be by slow and well-measured steps. The great obstacle in the way of a rapid building up of our export trade on the basis of a merchant marine, is the high cost of production, growing out of the high cost of labor. There is a gradual equalization in progess in this respect. While labor will never decline to the low limits of foreign countries, it will gradually equalize itself thereto, while wages of foreign mechanics will improve, because of emigration, the growth of higher demands, and a multitude of minor agencies which will enter into the question of wages. The tariff contest promises to assume a shape which will make the building up of an export trade an easier matter. The

industrial interests are not united on this important point. The admission of raw material free of duty will be strenuously advocated, and in the end, that form of free trade will be established; but what is raw material to one, is the finished product to another, and this fact will lead to a constant struggle. But the outcome must be in lower duties, in order that the vast producing capacity of the shops and mills of the country may be profitably engaged in supplying not only the home trade, but the vast foreign trade, especially of the Central and South American countries, which can be secured as soon as we are in a position to compete with foreign producers.

The iron trade is passing through a season of low prices and dull demand. About two-thirds of the capacity is now engaged. Bar iron sells at 1¾ to two cents per pound; nails at $2.60 to $2.90 per keg, according to the location of mill. Spikes at $2.60; pig iron, $19 to $21 per ton for foundry, according to quality, and $17 to $18.50 for forge iron. Bessemer iron is $20 to $21; Spiegeleisen, $30 to $31; muck bars, $32 to $34, according to quality. Iron for engineering requirements, 2½ to 3½ cents per pound. Plate iron, 2½ to 5½ cents per pound. Sheet iron has been in very active demand all the season, but the falling off in requirements has caused a temporary dullness. The establishments manufacturing pipes are unusually busy, owing to the increasing demand for gas and steam pipe. The various steel mills in the country are turning out less steel than at any time in three or four years. The agricultural implement works, carriage works, and other establishments consuming iron and steel, report less activity. The importations of iron and steel are about half this year of what they were last year. Reductions in wages are announced to take place on January 1st, and it is probable that this reduction of the cost of production throughout the iron and steel trades will amount to about fifteen per cent. below present rates, excepting in those localities which are controlled by a sliding scale.

The coal trade is particularly active, and in the anthracite interests high prices are maintained by reason of the perfect organization of that interest, and the limited supply available. The market for this valuable fuel has been extended East, South and West. The local manufacturing demand is dull because of the inactivity in the iron trade, but this is fully offset by the opening up of the new markets in the regions mentioned. The bituminous coal field is the theatre of more activity and enterprise than for many years, and in Pennsylvania, Ohio, Virginia, and one or two other States, the bulk of the desirable coal area has been purchased by capitalists and syndicates for the purpose of holding for future development. Several hundred miles of coal roads have been constructed, and long and short lines are projected, to be constructed next year into the new coal fields in the North and South. This activity is due to the diversification of manufacturing interests, and the great increase in manufacturing.

The coke trade, especially in western Pennsylvania, is in a very favorable condition, barring low prices. In the Connellsville region, 11,000 ovens are profitably engaged. A syndicate is now in possession of nearly one-half of the entire producing capacity of the region. It is the intention of those controlling this syndicate to obtain possession of all, and possibly to the disadvantage of consumers, who will be deprived of the advantages of competition. Several new coke fields have been developed in other States, and it is quite probable that the demand for coke will lead to the opening up of new sources of supply, wherever mineral suitable for coking purposes can be found. The Southern coal fields are attracting more than usual attention but their remoteness from markets is a serious obstacle to their early development. The development of these fields will depend mainly upon the growth of local manufacturing interests.

THE New York *Times* remarks that, while the railway companies of this country were perfecting a new system of time standards in the United States, an international conference at Rome was endeavoring to establish a common meridian by which the time of the whole world should be governed. The conference has adopted the meridian of Greenwich, and it is expected that this action will be ratified by the nations of the civilized world. The plans of the railways in this country and of the Rome conference coincides so far as the United States is concerned, and this fact furnishes another argument in support of our new standards. With the prime meridian at Greenwich, there are to be twenty-three secondary meridians, just one hour apart in time, by which time in all parts of the world is to be regulated. Our railway time standard for the East—the seventy-fifth meridian—will coincide with the fifth secondary standard in the plan devised for the whole world, counting westward from Greenwich, and our other standards—those of St. Louis, Denver, and Carson City—will coincide with other secondary standards adopted by the international conference. It appears, therefore, that our national system will virtually be a part of the cosmopolitan plan.

OF ten transcontinental railroads in the New World, three have been completed. Taking the whole number in order, beginning north, the first is the Canadian Pacific Railroad, extending from the St. Lawrence to Port Moody in British Columbia. In the United States, the Northern Pacific extends from Lake Superior to Puget Sound and Portland; the Union-Central, from Council Bluffs, by the basin of the Great Salt Lake, to San Francisco; the Atlantic and Pacific, or thirty-fifth parallel route, from St. Louis through the Indian Territory, New Mexico, Arizona, and California, to the Pacific coast; and the Southern Pacific, which may be said to begin at New Orleans, extends through Texas to El Paso, thence westward through Southern New Mexico and Arizona to Fort Yuma, on the Colorado, and through California to San Francisco. The Atchison, Topeka, and Santa Fé Railroad has extended its lines far to the southwest, and has acquired, by purchase, the Sonora Railway, recently built northeastward from Guaymas, on the Gulf of California, towards the Santa Fé lines in Arizona or New Mexico. The transcontinental route thus made will end in Mexican territory. In Mexico a line crosses from Tampico to San Blas; and the second from Vera Cruz, by the city of Mexico, to Manzanillo, and another, the Tehuantepec Railroad, across the isthmus of that name. The Panama Railroad is the last to mention in the list of ten, completed or which will be completed.

SUSCRIBE for the AMERICAN RAILROAD JOURNAL.

A Railway Mission Car.

IT may be a new name, and seem a novel idea to some, to see the word "mission" in any way connected with the railway service; but the strangest thing about it is, that the name and the work have not been adopted long ere this. More than twenty years ago, the Sunday school children of this country built the missionary vessel, "Morning Star," by their contributions. It has proved a success. Seamen's Chapels have been established for years, and many a floating bethel has been a snug harbor for sailors. For twelve years, mission work in its broadest and fullest sense, has been carried on among railway men. Its methods have been through libraries, reading rooms, cottage meetings, and the agency of men fitted for the work, who have been employed and paid by the corporations as general secretaries. The Vanderbilt lines have been among the foremost to endorse these methods.

The effort to establish Mission Cars has grown out of necessities developed in evangelistic labors by those engaged in that branch of the work from the Woman's Christian Temperance Union, and others. The Baltimore and Ohio, one of the leading corporations of this country, has been notably in the advance in this method. It has lighted, warmed, and given the free use of buildings along its line for the purpose of holding Gospel Temperance meetings, Bible readings, etc., thereby promoting and stimulating the best interests of its employés. It has aided those engaged in the work in many important and legitimate ways, reaping the best results in its own interests.

While meetings were being conducted at South Baltimore, in 1881, among the railway men living in that section, it became a very important matter to secure some convenient place for holding services in the immediate vicinity of the Baltimore and Ohio shops. An old car which was used to bring the workmen out from the city in the morning and carry them back at night, stood upon the siding. Leave was obtained to use this car for the meetings. In this car that grand work began, which has spread westward more than five hundred miles along the line of the Baltimore and Ohio railroad, and which is now destined to spread over this continent.

As a result of the success, and the wide field opening before this branch of mission work, the plan of Mission cars was suggested. Its practicability has been demonstrated. It remains that it be carried on under wise and judicious management. Below we give a floor plan of the Mission Car "Bethlehem," for the building of which, efforts are now being made to raise funds. We have already given a brief outline of the project.

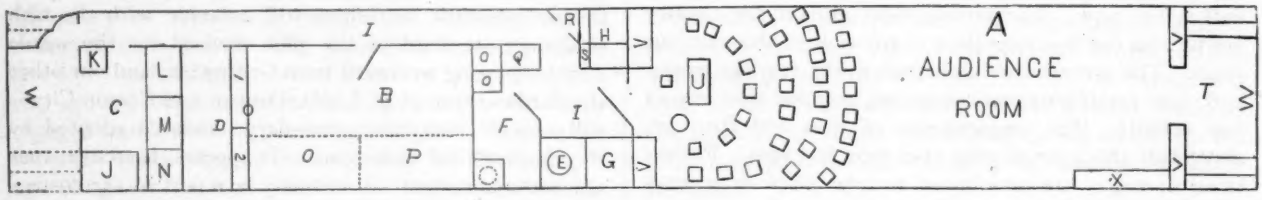
DESCRIPTION OF CAR.

A. Audience room, 29x8-10 (seats 50 persons); B. Dining room, 12x6-10; C. Kitchen, 5½x6-10; D. Pantry, 3½x6-10, with cupboards 1-2; E. Heater, 2½x3; F. Toilet, 3½x5; G. Closet, 2½x3; H. Closet; I. Passage; J. Range; K. Sink; L. Locker; M. Locker; N. Coal box; O. Page Bed; P. Page Bed; Q. Wardrobe; R. Wardrobe; S. Water-tank; T. Entrance to audience room; U. Organ; V. Seats, permanent; Z. Camp-stools used for seats; W. Platforms; X. Library for books.

The exterior resembles an ordinary first-class passenger car. It is 58 ft. 6 in. in length, 9 ft. 6 in. in width, and stands about 13 ft. 10 in. in height above the rail. The interior is divided into three apartments. The main, or audience room is arranged for a reading room when not otherwise in use. It is to be furnished with a carefully selected library, and to be supplied with magazines, illustrated and daily papers. Its principal use, however, will be for holding Bible readings and Gospel meetings. It is to be supplied with a good organ for singing classes and song service.

The cooking and sleeping apartments, toilet rooms, etc., occupy the rear of the car, and are conveniently arranged so that those in charge of the work can remain with the car night and day. In short, the car is a portable church and parsonage.

The sum which it is desired to raise for this enterprise, is $18,000, divided into shares of $10 each. About $10,000 will be required in building the car and in its outfit. The balance to be reserved as a fund for defraying necessary expenses, repairs, etc.



Mr. E. A. Harris, of Fitchburg, Mass., is acting for the present, in charge of moneys and pledges, to whom subscriptions may be sent, or of whom inquiries in regard to the work may be made. He is a conductor on the Old Colony Railroad, and his integrity is "indorsed" by many prominent persons, including the Rev. G. R.W. Scott, D.D., Rev. S. L. Blake, D.D., Rev. E. H. Smith and ex-Congressman Norcross, of Fitchburg.

Louisville and Nashville Railroad.

The earnings of the Louisville and Nashville Railroad Company for the years ending June 30, 1882 and 1883, were as follows:

	1882.	1883.
Main Stem	$ 2,046,424 64	2,946,239 64
Bardstown Branch	24,754 77	24,117 52
Lebanon-Knoxville Branch	385,141 14	467,773 07
Richmond Branch	45,790 54	28,960 13
Cecelian Branch	45,833 60	.....
Memphis Line	1,042,008 59	1,138,064 43
Evansville, Henderson and Nashville Division.	1,101,135 22	1,099,706 07
St. Louis Line	838,523 22	931,404 77
New Orleans and Mobile Railroad	909,860 29	1,017,786 53
Pontchartrain Railroad	14,396 08	12,849 59
Nashville and Decatur Division	1,101,608 99	1,034,230 95
South and North Alabama Railroad	1,311,253 53	1,508,740 18
Mobile and Montgomery Railway	987,354 39	1,119,238 67
Pensacola Division	180,834 33	153,701 59
Pensacola and Selma Division	60,998 01	62,542 15
Montgomery and Selma Division	100,265 43	100,168 16
Cumberland and Ohio Railroad—Southern Division	42,978 72	40,507 12
Glasgow Railroad	20,013 80	19,280 91
Cincinnati Division	574,320 96	960,703 46
Lexington Branch	227,769 45	337,386 65
Shelby Branch	30,977 15	72,928 83

Cumberland and Ohio Railroad—Northern Division	13,312 36	30,430 42
Louisville Railway Transfer Co	74,981 99	113,941 80
Louisville, Harrod's Creek and Westport Narrow Gauge Railroad	7,026 85	14,224 64
	$11,987,744 55	$13,234,916 28

Operating expenses:

Main Stem	$1,278,432 26	$2,238,181 15
Bardstown Branch	19,010 16	16,313 37
Lebanon-Knoxville Branch	206,190 22	256,945 10
Richmond Branch	31,827 28	27,545 00
Cecelian Branch	35,620 79	.....
Memphis Line	793,793 70	767,097 54
Evansville, Henderson and Nashville Division	613,790 16	657,530 82
St. Louis Division	617,731 21	627,520 68
New Orleans and Mobile Railroad	534,146 62	602,094 02
Pontchartrain Railroad	21,115 78	21,968 69
Nashville and Decatur Division	656,679 75	654,024 13
South and North Alabama Railroad	965,149 61	1,032,401 52
Mobile and Montgomery Railway	693,257 27	744,802 95
Pensacola Division	145,490 76	125,927 76
Pensacola and Selma Division	88,941 85	65,276 52
Montgomery and Selma Division	81,895 08	63,317 30
Cumberland and Ohio Railroad	25,183 51	31,163 80
Glasgow Railroad	13,583 26	13,099 01
Cincinnati Division	437,004 86	746,390 12
Lexington Branch	118,973 59	235,745 68
Shelby Branch	32,197 53	43,574 40
Cumberland and Ohio Railroad—Northern Division	19,591 65	39,595 02
Louisville Railway Transfer Co	39,607 33	70,990 70
Louisville, Harrod's Creek and Westport Narrow Gauge Railroad	14,156 02	18,090 47
	$7,429,370 35	$8,099,595 75

Net earnings:

Main stem	$1,667,992 38	$1 708,058 49
Bardstown Branch	5,744 61	7,804 15
Lebanon-Knoxville Branch	178,950 92	210,827 97
Richmond Branch	13,963 16	1,415 13
Cecelian Branch	10,212 81	.....
Memphis Line	302,214 89	370,966 89
Evansville, Henderson and Nashville Div'n	487,345 06	442,175 25
St. Louis Division	220,792 51	303,884 09
New Orleans and Mobile Railroad	375,713 67	415,692 51
Pontchartrain Railroad—Loss	6,719 70	9,119 10
Nashville and Decatur Division	344,929 24	380,206 82
South and North Alabama Railroad	346,103 92	476,338 66
Mobile and Montgomery Railway	294,277 12	374,435 72
Pensacola Division	35,343 57	27,773 83
Pensacola and Selma Division—Loss	27,943 84	2,734 37
Montgomery and Selma Division	28,370 35	36,850 86
Cumberland and Ohio Railroad—Southern Division	17,795 21	9,343 32
Glasgow Railroad	6,430 54	6,181 90
Cincinnati Division	137,316 10	214,319 34
Lexington Branch	108,795 86	101,640 97
Shelby Branch—Loss in 1882	1,220 38	29,354 43
Cumberland and Ohio Railroad—Northern Division—Loss	6,279 29	9,181 60
Louisville Railway Transfer Co	35,374 66	42,951 10
Louisville, Harrod's Creek and Westport Narrow-Gauge Railroad—Loss	7,129 17	3,865 83
	$4,558,374 20	$5,135,320 53

The following statement will show the sources from whence the above earnings were derived:

	1882.	1883.
Freight earnings	$8,050,339 04	$8,786,574 49
Passenger earnings	3,007,464 74	3,379,178 26
Express service	246,216 97	390,605 26
Mail service	280,806 71	291,880 83
Train privileges	8,338 20	8,331 86
Rent passenger cars	41,462 11	39,965 03
Rent freight cars	153,298 79	205,252 46
Detention of cars, storage, etc.	1,587 02	1,504 29
Pig iron storage	3,516 50	3,002 58
Rent engines	134,164 30	175,256 22
Rents	32,478 63	31,468 00
Net profits on Commissary Department	26,160 10	20,609 20
Bridge tolls	.....	587 80
Advertising on freight cars	.....	700 00
Wharfage and storage	1,909 44	.....
Total gross earnings	$11,987,744 55	$13,234,916 28
Expenses, as above	7,429,370 35	8,099,595 75
Net earnings from traffic	$4,558,374 20	$5,135,320 53
Realized from investments	266,442 35	134,770 05
Total credited to income account	$4,824,816 55	$5,270,090 58

The charges against income account in the fiscal year 1882-'83, were:

Interest and rentals	$4,207,984 00	
Taxes	339,409 18	
		4,547,393 18
Net surplus for the year		$722,697 40

—of which $397,481.06 has been absorbed in the payment of sinking funds, reducing to that extent the bonded indebtedness; and $250,065.35 was expended in new construction, improving the property and leading to a reduction in the cost of operation.

The average length of roads operated for the year was 3,032 miles—showing that the gross earnings per mile were $6,513.24, the operating expenses $3,986.02, and the net earnings $2,527.22.

The ratio of operating expenses to earnings in 1882-'83 was 61.20 per cent. as against 61.97 per cent. in 1881-'82.

A further analysis of the report for the year ending June 30, 1883, shows that the earnings of the Main stem were: from freight $1,856,496.98, passengers $546,981.37, mail $56,867.69, express $65,167.19, miscellaneous $420,726.41; of the Bardstown Branch: from freight $14,627.57, passengers $7,934.05, mail $768.63, express $645.83, miscellaneous $141.44; Lebanon-Knoxville Branch: freight $320,261.08, passengers $130,209.87, mail $7,146.94, express $8,637.73, miscellaneous $1,517.45; Richmond Branch (July to December, 1882): freight $18,131.74, passengers $9,312.14, mail $1,055.34, express $379.27, miscellaneous $81.64; Memphis Line: freight $677,069.55, passengers $370,793.83, mail $56,953.84, express $30,560.41, miscellaneous $2,686.80; Evansville, Henderson and Nashville Division: freight $883,490.23, passengers $196,335.42, mail $10,023.36, express $8,636.53, miscellaneous $1,220.53; St. Louis Division: freight $650,412.96, passengers $243,215.10, mail $15,119.18, express $19,225.54, miscellaneous $3,430.99; New Orleans and Mobile Railroad: freight $577,010.25, passengers $380,141.82, mail $28,529.88, express $21,872.85, miscellaneous $10,231.73; Pontchartrain Railroad: freight $2,450.93, passengers $10,307.66, miscellaneous $91; Nashville and Decatur Division: freight $784,422.10, passengers $213,666.65, mail $13,744.74, express $16,001.92, miscellaneous $6,395.54; South and North Alabama Railroad: freight $1,171,264.82, passengers $291,832,87, mail $12,077.95, express $18,232.87, miscellaneous $15,331.67: Mobile and Montgomery Railway: freight $735,460.63, passengers $311,081.03, mail $34,107.76, express $27,418.55, miscellaneous $11,170.70; Pensacola Railroad: freight $107,841.26, passengers $40,458.70, mail $1,920.72, express $2,322.46, miscellaneous $1,158.45; Pensacola and Selma Division: freight $48,119.84, passengers $11,378.30, mail $1,719.39, express $696.94, miseellaneous $627.68; Montgomery and Selma Division: freight $44,328.60, passengers $50,247.62, mail $3,287.32, express $1,573.64, miscellaneous $730.98; Cumberland and Ohio—Southern Division: freight $26,245.60, passengers $12,097.98, mail $1,361.46, express $773.48, miscellaneous $28.60; Glasgow Railroad: freight $11,178.34, passengers $7,185.45, mail $518.52, express $398.60; Cincinnati Division: freight $526,629.88, passengers $338,524.64, mail $37,356.32, express $48,661.91, miscellaneous $9,728.71; Lexington Branch: freight $158,129.72, passengers $155,728.54, mail $5,559.90, express $16,612.09, miscellaneous $1,356.40; Shelby Branch: freight $45,500.07, passengers $24,648.44, mail $834.22, express $1,933.23, miscellaneous $12.87; Cumberland and Ohio—Northern Division: freight $16,450.94, passengers $11,804.39, mail $1,310.27, express $846.22, miscellaneous $1.60; Railway Transfer: freight $105,444.80, passengers $7,302.81, mail $1,194.19; Narrow Gauge Railroad: freight $5,605.60, passengers $8,189.58, mail, etc., $429.46—total, as above, $13,234,916.28.

The extension of the Lebanon-Knoxville Branch southward from Livingston reached the Cumberland River in December, 1882, and the Tennessee State Line at Jellico,

60½ miles from Livingston, in April, 1883. It was opened for local traffic to Williamsburg, 49 miles south of Livingston, in December, and through trains between Louisville and Knoxville commenced to run on the 4th of June.

The Madisonville Branch, extending from Madisonville, on the main line of the Evansville, Henderson and Nashville Division, to Providence, Ky., 16 miles, was completed and opened to business in November, 1882. It is operated as a part of the Evansville, Henderson and Nashville Division.

The Pensacola and Atlantic Railroad, running eastward from Pensacola, Florida, was finished to the Apalachicola River in January, 1883, and the bridge over that river at Chattahoochee was completed in April, enabling through connections at that point with the railroad systems of southern Georgia and of eastern and central Florida. This road is not operated as a part of the Louisville and Nashville system—the company being interested in it only as owner of $1,550,000 of the $3,000,000 capital stock.

The Owensboro and Nashville Railroad, which is also operated under separate organization, is 36 miles in length, extending from Owensboro south. Arrangements have been made and funds provided, by the assistance of this company, to extend it during the present year to Adairville, a further distance of 49 miles. The company owns $959,400 out of a total issue of $1,156,500 of the capital stock.

The company also owns $105,000 of the $200,000 capital stock of the Nashville and Florence Railroad Company, and has advanced on the securities of that company the funds required to extend its road to the Tennessee and Alabama State line, 56 miles from Columbia; 20 miles of the road from Columbia, south, are now in operation, and the other 36 are under contract to be completed by January 1, 1884.

During the year the company has advanced to the Henderson Bridge Co. $86,723.81, making the total amount advanced to June 30, 1883, $146,885, all of which has been expended on the bridge and its approaches—including payments for right of way for the greater part of the nine miles of railroad which is being constructed from the terminus of the bridge in Indiana to the city of Evansville. It is expected that the bridge will be completed by January, 1885.

The net income of the Georgia Railroad (in which this company is jointly interested with the Central Railroad Co. of Georgia) for the fiscal year ending March 31, 1883, was $619,712.63, against $449,521.18 for the preceding year, an increase of $170,191.45. Out of the net income of these two years the lessees have expended $120,844.18 in the extension of the Athens Branch.

The surplus income of the Nashville, Chattanooga and St. Louis Railway (which operates under its own organization, but in which this company owns a majority of the capital stock) for the year ending June 30, 1883, was $376,445.53, against $289,021.10 in the preceding year, an increase of $87,424.43. Out of the surplus of 1882–'83 there was expended $104,465.32 for improvements and additions to property, leaving an unexpended surplus of $271,980.21. There was also declared a dividend of two per cent., amounting to $133,400, payable October 1, 1883: the last previous dividend was in April, 1882, when one and one-half per cent. was declared. The net earnings of this road for the months of July and August, 1883, give an increase of $47,565.67 as compared with 1882, and $77,520.50 as compared with 1881.

The length of roads operated by the company, June 30, 1883, was as follows: owned absolutely, or through the ownership of the entire capital stock, 1,616.35 miles; operated under lease, 260.04 miles; operated for account of South and North Alabama Railroad Company (being the owner of a majority of its capital stock), 188.88 miles, making a total of 2,065.27 miles, against 2,028 miles in 1882, an increase of 37.27 miles; and the average miles operated for the year 2,032 against 1,971 in 1882, an increase of 61.

In addition to the 2,065.27 miles of road operated by this company, it is also interested, as the owner of a majority of the capital stock of the company operating outside of its own system, in the Nashville, Chattanooga and St. Louis Railway 554 miles, the Pensacola and Atlantic Railroad 161 miles, the Owensboro and Nashville Railway (of which 44 miles have been completed, and 41 miles are under construction) 85 miles, and the Nashville and Florence Railroad (of which 20 miles have been completed and 36 miles are under construction) 56 miles, and as joint lessee with the Central Railroad Company of Georgia of the Georgia Railroad and dependencies 614 miles.

At the close of the last fiscal year (June 30, 1882), the capital stock of the company amounted to $18,133,513; since that date the $3,080,000 stock held by the City of Louisville (as security for the loan to this company of its $850,000 bonds), has been released, increasing the capital stock to $21,213,513; a further increase of $8,786,487 was authorized at the annual meeting of the stockholders, held October 4, 1882, making the total amount, June 30, 1883, $30,000,000, of which $25,000,000 has been listed in New York, and the remainder is in the company's treasury. From sales of the stock thus released, and of the increased stock so listed, $2,575,000 have been realized to the treasury of the company.

The total mortgage debt of the company (not including $1,500,000 Lebanon-Knoxville Branch bonds, $2,677,000 Mobile and Montgomery Division bonds, $1,248,000 Pensacola and Selma Division bonds, and $3,208,000 Louisville, Cincinnati and Lexington Railway general mortgage bonds, which are included in the $10,000,000 Trust bonds) amounts to $57,903,230, which added to the $25,000,000 of capital stock, gives a total of $82,903,230. The mileage of roads upon which the above debt and stock are based is as follows: owned absolutely, 976 miles; owned absolutely and not completed, 32 miles; roads in which the capital stock is owned entirely by the company, 720 miles, a total of 1,728 miles; the bonded debt and capital stock being therefore equivalent to $47,976 per mile.

The total expenditures during the year for improvements and additions to the several properties amounted to $675,512.57, from which has been deducted $142,652.07 on account of over run, in the year 1882, in materials charged out above cost, leaving the net amount charged to construction account $532,860.50, which has been provided for as follows: from car trust of 1881, $282,795.15; and from earnings, $250,065.35.

Of the 2,065 miles of road operated, 1,276 miles are laid in steel and 789 in iron; of the above, 1,713 miles are main

lines, of which 1,264 are laid in steel and 449 miles in iron.

The total fixed charges against income account for the ensuing year (1883-'84) for interest on bonds, rentals and guaranteed dividends—not including general interest account, which is more than offset by balances carrying interest due this company—is stated at $4,268,377.

The floating debt of the company, as given in the annexed statement, (excluding bills and pay rolls for June, and interest due July and August) shows $1,065,310.74 against $2,662,554.42 at the close of the previous year.

During the first three months of the present fiscal year the gain in earnings was over $460,000, while the operating expenses run about 58 per cent.

COST, RESOURCES AND LIABILITIES.

Total cost of road to June 30, 1883		$67,385,425 70
Sinking fund Louisville, Cincinnati and Lexington Railway	$50,000 00	
Bonds owned by the company	1,072,380 00	
Stocks owned by the company	8,565,852 31	
United States Government 3 per cent. bonds	868,243 09	
		10,556,475 40
Nashville and Decatur Railroad Company	573,043 73	
South and North Alabama Railroad Company	1,454,903 60	
Mobile and Montgomery Railway Company	143,540 08	
Owensboro and Nashville Railway Company	347,136 08	
Pensacola and Atlantic Railroad Company	148,982 34	
Nashville and Florence Railroad Company	135,146 91	
Henderson Bridge Company	146,885 00	
		2,949,637 74
Due from transportation	$566,661 47	
Bills receivable	586,584 59	
Sundry railroads and persons	858,084 00	
Real estate, quarry and timber lands	715,752 71	
		2,727,102 77
Shop, road, and fuel supplies	$833,112 33	
Cash	242,925 89	
		1,076,041 22
Stocks and bonds held in trust (net amount)		9,527,877 74
Total		$94,222,560 57
Capital stock		$30,000,000 00
Mortgage debt		57,903,230 00
Due sundry railroads and persons	$502,657 99	
Bills payable	526,558 32	
Back dividends	36,094 43	
Bills and pay-rolls for June	628,278 48	
Interest due July 1 and August 1	445,358 92	
		2,138,948 14
City of Louisville bonds	$850,000 00	
Debentures, account recent acquisitions	567,400 00	
		1,417,400 00
Profit and loss account		2,762,982 43
Total, as above		$94,222,560 57

President—C. C. BALDWIN.

Vice-President—MILTON H. SMITH.

Second Vice-President—GEO. A. WASHINGTON.

Third Vice-President—F. D. CARLEY.

Directors—C. C. Baldwin, F. D. Carley, E. H. Green, John E. Green, Jay Gould, W. C. Hall, J. S. Rogers, Thomas F. Ryan, Russell Sage, Geo. A. Washington, W. F. Whitehouse, W. S. Williams, Jas. T. Woodward.

Secretary—WILLIS RANNEY.

Ass't to President and Ass't Secretary—A. M. QUARRIER.

General Manager—MILTON H. SMITH.

THE recent death of the Hon. Ginery Twitchell, of Massachusetts, recalls the old stage-coach days in New England. Forty years ago Mr. Twitchell was a famous stage driver. He lived to become a railroad president, and for six years was a Representative in Congress. The main stage line ran north through Massachusetts, with branches into New Hampshire and Vermont. He performed remarkable feats in the way of getting the mails through on time. On one occasion a blinding snow storm came on with such fury that it was impossible for horses to travel. He put on snow shoes, and carried the mail bag on his back from Worcester to Coldbrook, seventeen miles, in five hours.

Growth of the Train Brake.

ANGUS SINCLAIR, IN AMERICAN MACHINIST.

ALTHOUGH a velocity equal to the highest speed common with railroad trains of to-day was attained during the first ten years of railroad practice, almost forty years elapsed after railroad locomotion was a pronounced success, before any reliable system was established of bringing trains quickly to a state of rest. Up to the year 1870 the ordinary fast train resembled in a striking manner the Congreve ricochet-rocket, made famous in the early railway days to illustrate the helpless condition of a fast running train. The power was there to originate the speed, but when a sudden demand arose for stoppage, in too many cases the only retarding forces available were the natural resistances to the moving mass. In regard to the speed of trains, railroad engineers resembled Ulysses when he released the winds, and raised a tempest that he could not subdue.

This condition of helplessness led to many a grievous disaster before the traveling public were educated to demand with the voice of authority, appliances for stopping trains promptly whenever necessary or desirable. And then it was no easy matter to impress railroad managers with the belief that a good system of brakes could be devised, which would do the work of absorbing the speed far more quickly than steam could produce it.

During the first decade of railroad life, engineers were so much occupied with plans and improvements for increasing the efficiency of the locomotive as an agent of speed and traction, that almost no attention was bestowed upon the means of restraining or controlling the velocity attained. This was all the more surprising, as the locomotive of these times equipped with drop hooks was a peculiarly helpless machine, when called upon to aid in stopping the train it had set in motion. With the link motion of later years, the steam could be depended upon by reversed motion to aid in stopping; but the drop-hook nearly always failed to catch when an attempt was made to reverse the motion when the engine was running at any speed, and the V hook was not much better. Yet with this helpless condition of the locomotive, the rude brake that controlled the country wagon was deemed sufficient for holding passenger trains.

A horizontal lever with a bell crank at the end, to which was connected a wooden block, was the first form of brake used. When a call for brakes was made, the brakeman dropped the lever out of its notch, and stood upon it to increase the pressure upon the wheels. Some early roads were not even so well provided as this with the means of stopping. It is recorded that on a South Carolina railroad, for some time after trains began to run regularly, the only means of stopping a train at a station was by all the men round clinging to the cars holding them back, or by pushing pieces of cord-wood between the spokes of the wheels.

On most roads the hand-lever brake was early displaced by the hand-wheel and chain for passenger equipment, an improvement which rapidly became the recognized method of stopping trains. When the four-wheel truck first came into use, the brake attachment consisted of four vertical wooden blocks, two of which were hung between each pair of wheels, and were applied by a canting bar fastened between the blocks, and operated by a lever connected with

the chain. The wooden blocks were lined with leather which endured the rubbing wear of the wheels better than the wood, besides being easily renewed when worn. This crude rig was superseded before 1840 by the common freight car brake of 1883, which has experienced remarkably few improvements since it was invented. Wooden blocks have been exchanged for iron shoes, and the working parts have been made a little stronger. Where power is applied to the brake, some complication of levers has been introduced to equalize the pressure, but the brake is essentially the same as it was in 1840.

The common car brake had points about it which gave strong recommendations in the eyes of railroad men. It was simple and tolerably efficient for slow speeds, and it rarely got out of repair, while every part about it was easily reached, and any man could understand it. By degrees it worked into universal favor, not only with railroad men, but also with the traveling public. By the time trains became heavier and the common speed too high for safe control by any hand-brake, this brake had become time-honored, and it is always a difficult matter superseding a time-honored institution, however long it may have outlived its usefulness.

The first ten years of railroad life were remarkably free from serious accidents resulting in loss of life. This permitted the crude methods of operating to be accepted as satisfactory. Had any of the terribly fatal accidents which happened later through defective brakes and want of signals, taken place in the first five years of train service, the probability is that operating appliances would have been improved, so that much subsequent destruction of life and property would have been avoided. What were really reckless practices, were regarded as ordinary concomitants of the new method of transportation. Recurring fatal accidents were needed to convince the public that the hand-brake was not perfect. The grim missionaries, Disaster and Death, went the rounds of railroad trains with appalling frequency, before the first American locomotive was twenty years old, and inventors were called upon to provide better means for controlling trains.

Ever since the need of a brake superior to a hand-brake became recognized, those possessing the highest mechanical talent of the country have labored to produce a brake whereby the whole train would be automatically subjected to retarding action. The first attempts in this line were made to devise means of operating the brakes from the crowding together of the cars. This class of brakes are known as bumper brakes, and the crop of patents for devices of this kind has been remarkably fertile. It began to grow about 1845, and the harvest is not yet over. No bumper brake came into practical use in the days when an improvement on the single hand-brake was urgently needed.

The first real improvement effected on the hand-brake was the connecting of the brake on both trucks, so that the hand-wheel at one end of a car applied the brake to both trucks. By means of this invention a brakeman could apply brakes to four trucks, without having to move except from one platform to another. It almost doubled the work that one brakeman could do. The credit of this invention is no doubt due to Willard J. Nicholls, car-shop foreman of the Hartford and New Haven Railroad. He did not patent his invention, and others appropriated its valuable features, passing it through the patent offices as their own. The invention drew many thousands of dollars from railroad companies, but none of the money went into the pockets of the real inventor. The Tanner brake of litigious memory appropriated the Nicholls invention entire. The Hodge and the Stevens brakes each were arranged to apply the brakes on both trucks from one end of the car; but neither of the inventors claimed that as the object of their patent. Their patents were obtained for certain arrangements of the rods and levers used in transmitting the power applied. Hodge received the patent for his brake in 1849, and his leading idea seemed to be the simplifying of the connections. When the Stevens brake was patented in 1851, the inventor claimed that by the arrangement of rods and levers, each wheel in both car trucks received a uniformly retarding force. This was the first claim for equalizing the pressure on brake shoes. Both these brakes proved highly successful. Within a few years one or the other of them was applied on nearly all passenger train equipment, and to the double trucked cabooses belonging to freight trains. And to-day the brakes hold a monopoly in these positions, the application of continuous power having interfered in no way with the original arrangements of these brakes.

The increase of train accidents, and the growth of public sentiment in favor of improved means of controlling trains, can be traced very clearly in the records of the Patent Office. Singularly enough, the American public have never looked with any favor upon signals, as a means of averting accidents. They call for means of seeing the track at all times, and for facilities for stopping in time to avert an accident after an obstruction is perceived.

Very few patents for brakes were applied for during the first fifteen years of railroad operation. The officials in the Patent Office were not very well informed in those days regarding brakes, for in 1847 we find them reporting, "two patents had been granted for valuable improvements in carriage brakes, which it would be difficult to describe intelligibly, and which will therefore be passed over." One of the "valuable improvements" alluded to was a worthless bumper-brake that never amounted to anything, and was utterly impracticable for the purpose for which it was intended. After this, the call for a good brake drew so many inventors upon the field, that before many years passed the Patent Office authorities had their experience wonderfully developed in that line. The year 1849 recorded five patents. In 1852 patents were granted to ten inventors of brakes, among them being the first steam brake, which was patented by Thomas Walber. A patent was taken out this year for equalizing the pressure on the blocks by means of springs. Few patents were granted in 1853, but two of them made their mark. The Creamer brake made its first appearance, and Stephen Morse, of Springfield, Mass., patented a cast-iron brake shoe, to be hung in such a position that it would fall from the wheel by its own gravity when not in use. The device invented by Wm. G. Creamer was the attaching of springs to the brake staff, and winding them up like the main spring of a watch, and holding the tension by a pawl which kept the brake off. This pawl was connected with the bell rope, and the engineer, when he needed to make a sudden stop, could apply all the brakes by jerking the rope. This brake was greatly improved in 1856, which made it the most successful emergency brake in use till the air brake appeared. By the year 1854, when twelve new brakes be-

came candidates for patronage, the period of brake improvement may be said to have fairly opened. Every succeeding year found increasing lists of new brakes, and inventors are still laboring industriously in a line that is now pretty well crowded.

Among the numerous brakes invented since 1850, there have been many devices possessing neither practical merit nor inventive ingenuity. Not a few of the appliances, on the other hand, showed the stamp of decided mechanical ability in adapting means to an end extremely difficult to accomplish. About this time, a persistent struggle was made to produce an easy working and practical continuous brake, whereby the engineer could control the train at will. In this respect the Creamer brake was too one-sided. It was all go, or all stop. Different forms of bumper brakes were tried, and chain brakes were invented in various shapes. The first practical brake of the latter form was the Loughridge, which was invented in 1855. It was a chain brake, and worked fairly. More than one attempt was made to do the braking by means of shoes that were dropped on the rail, and received pressure from the weight of the car. By those who supposed that sliding the wheels gave perfection of retarding force, the rail shoe plan was strongly urged, for it seemed to obtain the maximum holding result without damaging the wheels. To provide an automatic brake that would stop the train when the coupling parted, several complex devices of cogs, ratchets, chains and minor connections were produced. The trouble with these inventions was that the parts were too numerous for the rough usage of train service. Different bumper brakes aimed to be automatic in case of accident; but as none of the early inventions of this kind worked satisfactorily in making ordinary stops, their merits for meeting emergencies were never developed.

Surprise is often expressed that none of the numerous inventors who devoted their attention to brakes succeeded in producing a practical working continuous brake, before the air and vacuum brakes achieved success so late as 1870. The probability is that several of the inventions between 1845 and 1860 might have been developed into fair continuous brakes, but railroad companies gave inventors no encouragement. Most of railroad managers considered that the hand-brake was perfection, and they had no patience with inventors who disturbed the public mind with the impression that a safer and more effective brake could be produced. Where an appliance has to perform the complicated functions required of a continuous brake, the parts have to be finely adjusted and well proportioned for the work they must perform. To adjust a brake so that it could be operated effectively from one point, and yet be strong enough in every particular to stand the rough jostling of a train in rapid motion over an uneven track, where no two trucks stand in the same horizontal plane, was an extraordinarily difficult mechanical feat. All the details could hardly be evolved complete from the brain of the most accomplished inventor. Experience and observation in actual service were needed, so that weak points might be strengthened, and mistakes rectified. Numerous valuable inventions that were crude on first conception have been perfected in this manner. The first continuous brake needed to go through this ordeal, but it was practically impossible to induce railroad men to give it the opportunity for a thorough trial. An inventor might have the elements of an excellent brake, but if a minor part failed in a trial reluctantly granted, the brake was sneered into oblivion.

If railroad authorities in this country were slow in recognizing the necessity of a good continuous brake, those of other countries were equally behind. And with American inventors and American railroad managers lies the credit of having produced the only good automatic brakes that have been applied successfully in stopping trains.

Our English Letter.

Written Specially for the American Railroad Journal.

During the late session of Parliament fifty-eight railway bills received the royal assent. All of these were promoted by existing companies. The greatest extension provided for is a length of over fifty-eight miles, to be constructed by the Great Eastern Railway, with a proposed capital of £1,750,000, and borrowing powers to the tune of another half million pounds. England is provided with an unrivaled quantity of railways already, its tiny surface, as compared with your huge continent, being taken into account; but much remains to be done before a sufficiency can be recorded. Places so remote from the screaming locomotive are yet to be found, that the silence of the past centuries rests upon them. The thunder of nineteenth century progress never reaches the ears of their simple residents.

Although my last letter has a good deal in it about the late meeting of the British Association, held at Southport, I shall not be tedious in referring to one of the numerous excursions organized to promote its usefulness and pleasure. That I refer to had the Mersey Tunnel as its objective point, where two borings are being driven, one above the other. *Engineering* contains perhaps the best account of them. The lower is a drainage heading, and starting from the bottom of a shaft 180 feet deep, it rises with a gradient of one in five hundred towards the center of the river. It is taken out by hand to ten feet four inches in diameter, and is then lined with brickwork in cement, fourteen inches thick, thus leaving a net diameter of eight feet. At the time of the visit, an interval of five hundred and thirty yards separated the ends of the headings, which were being driven from the opposite banks of the river. The main tunnel, which is twenty-six feet wide and 20 feet high inside the brickwork, is reached by a shaft 90 feet deep, and is already completed for a considerable distance under the river bed, although of course it is far behind the drainage heading. The water is raised by compound differential pumping engines, of the type manufactured by Mr. Henry Davey. At the Liverpool end there are two engines, one capable of raising 288,000 gallons per hour, and the other of 96,000 gallons. The chief peculiarity of the differential engine is that it is capable of working with a high grade of expansion without the controlling action of a crank or fly-wheel. The water column and spear rods constitute a reciprocating mass, which performs the functions of a fly-wheel, and enables an eight or ten-fold expansion to be employed. The term "differential" is applied to the engine, because of its peculiar valve gearing, by which the engine motion is communicated to its own steam valves through the medium of a floating lever, having no fixed fulcrum, but which is made to move by independent mechanism in the

direction required for opening the valves, whilst the engine motion is imparted to the same lever in the direction for closing them. The resultant of the two antagonistic motions is that actually imparted. The independent motion is adjustable, and is rendered uniform, so that any increase in the velocity of the engine motion causes the valves to close earlier than they otherwise would. There is, therefore, a peculiar element of safety in this engine. The pumps are of the ordinary bucket lift kind with spears in the rising main.

A less pleasant subject is the returns made by the Board of Trade of accidents and casualties on railways in the six months ending June 30, 1883. During that period there were 553 persons killed and 2,047 injured on railways in the United Kingdom, as compared with 532 killed and 2,072 injured in the corresponding period last year. In 1882 the total number of persons returned to the Board of Trade as having been killed in the working of the railways during the year was 1,121, and the number of injured 4,601. Of the above numbers—127 persons killed and 1,739 persons injured, were passengers; but of these only eighteen were killed and 803 injured in consequence of accidents to or from collisions between trains; the deaths of the remaining 109 passengers killed, and injuries to 936 were due to other causes. Of the remainder, 553 killed and 2,576 injured were officers or servants of the railway companies, or of contractors; 441 persons killed and 286 injured were trespassers, suicides, and others who met with accidents at level-crossings or from miscellaneous causes. In addition to the above, the companies returned forty-two persons killed and 4,367 injured from accidents on their premises.

On November 1st the Pullman drawing-room and dining cars on the Midland Railway became the property of the company, and first-class passengers were allowed to use them without extra charge. The Midland is one of the most progressive, perhaps *the* most, of our railways. It was the first to run a penny a mile carriages on every train, and to abolish the second-class. Now that no extra charge is made for the use of the dining and sleeping cars, except, of course, for viands consumed, the only distinction of passengers is that between the first-class and cheap-rate passengers.

I am wondering whether you wide-awake American folks have taken due notice of the compound locomotive exhibited at the Amsterdam exhibition by Mr. F. Schichau, of Elbing. It seems that this ingenious gentleman has built compound locomotives for some years past. About two engines, built in 1880 for the Hanoverian Staats Railway, from the designs of Herr von Borries, the direction of that line expressed itself very favorably in January, 1881, stating that while in other respects they had given equal satisfaction to ordinary engines, in point of fuel a saving of 16.5 per cent. had been proved by careful comparison with other new non-compound locomotives of equal power and doing similar service. Two more built soon afterwards for the Royal Ostbahn, from Mr. Schichau's own designs, also met with a very favorable reception, and one of these was tried on two different lines against an engine of approximately equal power, when a saving in fuel in one case of 13.4 per cent. and in the other of 18.9 per cent. was found in favor of the compound system. The absolute coal consumption for the compound locomotive per mile on these trips was 15.6 pound in the former, and 13.4 pound in the latter case. These results in the saving of fuel, having been achieved, the wonder is that more has not been said and done with regard to the merits of the compound locomotive.

Speaking of the Board of Trade just now, and of cheap trains on the Midland, reminded me that that useful department of the government has addressed a circular to the principal railway companies, asking for information in reply to the following questions: 1. What accommodation is now provided by your company for passengers at fares not exceeding one penny a mile, and what accommodation is given by it in the shape of workmen's trains? 2. What workmen's trains are provided upon the railway, the stations between which they run, the length of the journeys, the hours of starting and returning, and the charges made; also the statutory obligations of the company (if any) with regard to workmen's trains. It should also be stated whether the accommodation provided in the carriages is such as to comply in each particular with the requirements hitherto made for parliamentary trains? 3. Whether your company propose to make any and what additions to or alterations in the accommodation thus given to passengers at or under 1*d.* a mile, or to workmen?

An ingenious Gaul is out with a proposal which, if ever carried out, (?) will make your boasted Brooklyn Bridge but a baby in the comparison, His conception is that of a railway bridge across the English Channel between Folkestone and Cape Grisnez. The plan provides for a series of bridges constructed on varying principles, so as to allow for the passage at certain points of vessels with the tallest masts, while, of course, preserving as nearly as possible a level road for the line. The center supports are designed to rest on the Varne and Colbart Rocks, the former serving also as a basis for a solid pier surmounted by a hotel. M. Verard de Sainte-Anne professes to have made the most careful soundings, and is convinced that the Channel bed affords a firm basis for the numerous piers, about thirty in all, necessary to support his main structure, He estimates that the mail train would take about an hour and thirty-five minutes in passing over the bridge.

Mr. Holroyd Smith has made public his new system of electric tramways. To insure safety to the public, protection of the electric force and tractive efficiency, he proposes the employment of a central channel to contain the wires or bands conveying the electric force, and effecting the haulage by means of a large wheel with a broad face running upon the surface of that channel. As regards the practical results obtained, the inventor says that though it is as much as three men can do to push his empty car, which, with dynamo and gear weighs sixteen cwt., up a steep hill, yet the electricity has been so collected and used as to run it up at a moderate speed with six adults in the car—total weight, say twenty-four cwt.

H. A. L.

*** If the names and address of persons likely to be interested in the AMERICAN RAILROAD JOURNAL are sent to us, specimen copies will be mailed them free. The sending to us of such names will be considered a favor. Our circulation has been largely increased by such thoughtfulness on the part of subscribers, and we ask a continuance of it.

Tramway.

[The English nomenclature of "Tramway" is adopted in this department as being of greater convenience and more specific in its meaning than "street railway," though in alluding to individual organizations we shall preserve their corporate titles. It is our hope to nationalize the term Tramway, which is now generally used in every English-speaking territory with the exception of the United States.]

American Street Railway Association.

President.—William H. Hazzard, Brooklyn, N. Y.
First Vice-President.—James K. Lake, Chicago, Ill.
Second Vice-President.—George B. Kerper, Cincinnati, O.
Third Vice-President.—D. F. Longstreet, Providence, R. I.
Secretary and Treasurer.—William J. Richardson, Brooklyn, N. Y.

A STEADY increase in the number of street car companies subscribing to the JOURNAL, is the best evidence that the enterprise exhibited in the editorial management of this department, is appreciated by those who are the best qualified to judge of it. Proportional improvement will be continued, with the augmentation of encouragement and consequent strength received, an assurance unnecessary to be made to those who have watched with interest the development of matter under the caption "Tramway," from its very modest beginning to its present proportions.

A CINCINNATI street car company has given eleven conductors, who have acted as such for one year, one hundred dollars each as a reward for faithful and efficient services, in accordance with a contract made between them and the company. There is no deviation in the contract named from the sound principle that money should be earned before paid. At the same time, its leading peculiarity commends it to the consideration of employers of labor. Hope and expectation are powerful inducements to diligence, and if a portion of wages takes, more or less, the form of reward, there is something gained in the pleasant relations established between those who labor and those who pay.

THE cars of the Third Avenue street railroad of this city are warmed by stoves occupying about the space of one seat. While we fail to see that these are either a troublesome or dangerous innovation, we cheerfully recognize the additional comfort attending their use. They occupy the same position as that of the stoves used on at least one line in Brooklyn, half way between the front and back entrance to the cars. In the absence of a better device than the use of stoves for warming street cars, we, as occasional passenger, are thankful for that which is.

AN article on the painting of street cars in this issue is one of a series which, we are sure, will prove both interesting and valuable.

A Reply to Mr. John Stephenson.

THE following letter in reply to a statement made through our columns, by Mr. John Stephenson, gives facts which are valuable in a discussion of increasing interest and practical importance.

SAN FRANCISCO, NOV. 1st, 1883.

Editor American Railroad Journal:

In your September number I notice the opinion of a veteran, Mr. John Stephenson, as to the motive power on tramways, in which he says: "Yet it is not at all demonstrated that even the cable system can be economically operated in any instance in comparison with horse power."

Mr. Stephenson cannot be aware of what is being done in San Francisco or Chicago, or he certainly would not have made quite so wholesale a declaration. The Sutter Street Railroad Company changed their system from horse to cable, and stated before the Court, their saving to be not less than thirty per cent. by the change; and the Market Street Cable Railway Company have just converted a horse road to the cable system, at a cost of over two millions of dollars, after an experience of ten years of horse roads, and five years' experience of the cable system as applied to the California street railroad; all three of these roads being in this city.

Yours truly,

W. W. HANSCOM.

Painting Street Cars.

BY A VETERAN.

I.

THE painting of a street car is, in many respects, a particular branch of industry. The painter who can successfully accomplish a job of carriage painting, may think himself competent to paint a car; but he finds when put upon this class of work that he has much to learn, although the manipulation of the brush and the general order of the coatings are similar, there is yet a vast difference in the two trades, and that he must become acquainted with peculiar methods or modes of procedure before he is an expert at car painting. On the other hand, the painter of a Pullman palace car will find that the methods employed in a street-car paint-shop are far below the standard he has been brought up to; while the ordinary passenger of a "tramway" (using an English phrase) is unaware of the variety of talent which is brought to bear upon the work on which his eye rests as he journeys along behind a pair of horses in a public vehicle of the kind now in course of remark. The street-car does not come up to the elegant steam car or "coach" of our railways, and there are but few who can appreciate the difference; but in an experience of several years, the writer holds the opinion that there is much to be learned by both the carriage-painter and the palace-car painter, from what may be said to be an intermediate profession. It is therefore my intention, in this article, to describe how the painting of a street-car is done, that he who may be called upon to do such work may carry it through to a successful issue.

The *priming* of any vehicle demands the greatest care, and many are the opinions held by painters regarding this particular point.

The "old masters,"—if such they may be called,—depended almost entirely upon white lead and oil for a priming paint to form the foundation for their color, ornamentation and varnish. And, certainly, we must accord credit to them for judgment regarding durability; for a piece of wood well filled with oil and lead is, as most of us know, made as durable as by any known method; but in the filling of the wood with the materials named, much *time* will be consumed, much labor expended (for one coat will not be sufficient), and much trouble and expense fol-

low in the perfect carrying out of the work. In our younger days, we knew no other plan of operation than the repeated coatings of lead and oil. Let us see what theory and common sense have done for us?

We knew that in order to make a solid foundation, that the pores of the wood must be filled to prevent the absorption of the liquids in the color, and of the varnish applied over it, and we therefore put on coat after coat of *lead and oil*, the first coat being nearly all absorbed; the second partially so; and the third, oxidizing upon the surface, our purpose was accomplished; but with what an amount of time! Forty-eight hours between coats was scarcely sufficient, and in order to have the paint dry hard, more time was given, often as much as a week, so that sometimes three weeks were allowed for the application of the three or four foundation coats of paint, which in a small establishment caused a crowding of work; the shop was filled at all times with work going through the several stages of drying and hardening, and the attendant expense was what we might now call *enormous*.

A lessening of time or of the coatings brought sudden decay, and our reputation as painters of durable work suffered at the hands of railway superintendents. At length another plan was adopted: instead of employing several coats of paint, *plastering* was resorted to. That is, the priming of oil and lead being on, the job was "smoothed over" with thick paint or putty, with a broad-bladed knife, so that the several coats were not needed to produce a foundation. This, of course, shortened the time of painting, up to the leveling down of roughstuff (which was then thought necessary), but with that speed which was demanded, by lack of room for storage, etc., the *plastering* was a poor subterfuge, and we looked around for a better plan. Liquid primings were now presented to the trade and received with pleasure, in some cases, and with fear in others, and when this means of shortening time was at hand, the business of the car-painter began to improve. The pores of the wood could, by a single coating, be permanently sealed up against moisture, and the foundation for leveling coats be at once obtained.

The priming of a car does not only include the exterior, but the interior as well, for if the interior is to be finished in varnish, as is the usual way, the desire will be to keep the varnish from "striking in," causing the application of several coats, and the liquid priming will form a solid foundation.

Having now given the particular points of advantage with the priming, we will describe the manner of its use for, unlike ordinary paint, it is not simply laid on with a brush. The car being well cleaned by the wood-worker of glue, raised grain, etc., a good dusting off is all that is necessary to make it ready for the first coat or priming. Pouring the priming material from the can into a convenient sized cup, with a stiff bristle brush the wood and iron is coated, as in painting, but the material is put on more sparingly and well rubbed with the brush. When a portion of the work has thus been gone over, soft rags are used to wipe over every part, thus driving the priming into the wood, and removing all that is not readily absorbed, for it is unlike paint, and if any particular amount is left upon the surface, it would be a long time in drying. Every part of the car being coated and rubbed over as stated above, forty-eight hours are given for drying, at the expiration of which time the outside may be coated with roughstuff, no sanding off or other preparation being necessary, but the first coat of roughstuff should have a trifle more oil in it than ordinarily given, after which two coats of roughstuff as usually mixed (providing the ready-prepared article is not used), may be applied, one coat each day. If it is not necessary (owing to price obtained,) to roughstuff the panels, one good coat of white-lead and oil will suffice to form a foundation for color, and on this the puttying, etc., may be done.

There are a vast number of street-cars painted as above —without roughstuff—and the durability of such work seems to be all that can be asked for. Those which are roughstuffed and rubbed being a little smoother only.

The coloring of a car demands attention in that no more paint be spread on than is necessary to give a solid color, for it is a well known fact that the least paint to form a solid ground is best where varnish is used over it, for thick coatings of paint absorb the life of the varnish, *i. e.* the oil, and sudden decay follows. Vermilion is a good panel color, but it must be mixed and applied in a certain manner to prevent its turning to a dark Indian red shade. A white ground is considered best for vermilion, and the dry pigment should be mixed with quick drying varnish and turpentine, so as to dry rapidly; japan, as a general thing, is too dark for this delicate color, and gives it a muddy appearance.

There are several brands of vermilion, and many prefer the cheaper grades to the English vermilion, which has ever proved best. Tieman's California vermilion was used for several years on the street-cars of the Third Avenue line in New York, and it gave general satisfaction; but as a rule, no dependence can be placed on any but the pure English red. Lakes are now mostly out of use, the plan of producing such colors being to first make a red ground, light or dark, then glaze with carmine, which gives any desired shade, and makes a far more durable job.

Yellow, green, blue and umber shades are in demand for this work, and when neatly striped and lettered in harmonious colors, they are good, but in nine cases out of ten the colors chosen are inharmonious, and yet the painter is not to blame. Where several cars are to be built for a road which has not already a distinctive color, the painter is directed to paint portions of a car in various colors so that the president, directors or superintendent of the road may examine and choose therefrom. And these individuals, often with no taste or knowledge of the combination of colors, direct that color or arrangement of colors, which to an educated eye is abominable, and in many cases directly opposed to the rules laid down by Chevreul the great French authority on the harmonious blending of colors.

This may be one of the things which cannot be avoided, yet the painter may sometimes modify a poor combination so as to improve it.

There is a variety of opinion regarding the kind of brush best adapted for laying color, some preferring a bristle brush, others a badger-hair, and others yet a camel's-hair blender. Now they are all good in their places, and the writer has often found it convenient to use them as follows: The bristle brush for white-lead and colors made principally with it; a badger-hair brush for vermilion; and camel's-hair brushes for other fine colors. The last named brush will lay the color thinner, more even-

ly, and economically than any other, but for heavy colors it is not so well adapted. The black used for moldings, etc., need not be the best ivory black, it is unnecessary; one of the inferior grades such as royal black, or even lampblack, for the difference in color upon so large a job, and that only upon moldings, is almost imperceptible. The black used for the dash-rail, brake-rods, window-guards, etc., should be a hard drying black japan.

The trucks of a car receive but little care in painting, for they are generally well covered with street mud, and a good coating of metallic paint and oil is all they require, but the outer face of the pedestals should be as well painted as the body.

The interior of street-cars being well primed with the light shade wood filling, all that is necessary is to give it a good rubbing over with fine sandpaper to prepare it for varnishing. "Inside rubbing varnish" will dry in from twenty-four to thirty-six hours, sufficiently hard for rubbing with pumice stone, when a second coat may be applied, and this, when dry and rubbed, will form as solid a foundation for a flowing coat of "inside finishing varnish" as is desirable on this class of work.

The outside of the car being colored, color-and-varnished, and mossed or rubbed off, is ready for striping, lettering and ornamenting. The styles of striping on cars has not changed materially in several years, although several lines have adopted the Eastlake or Japanese ornamentation, and when once a style is agreed upon there is seldom any change made. The lettering, however, will be found far different on many lines from that employed a few years ago, and this is due in a measure to the influx of sign writers to the car and wagon letterer's trade. Where a bold-face letter, well defined or balanced was once the style, we now see plain and fancy Roman, or what is worse, some such arabesque figures as shown in the line below.

What to Do.

These styles of lettering, although they may be pleasing to some eyes, should never be painted upon the sides of a public vehicle, for there are many who cannot possibly decipher them. A plain half-block or full-block letter is always readable, and should be employed.

A Comparison Between English and American Street Railroad Construction.

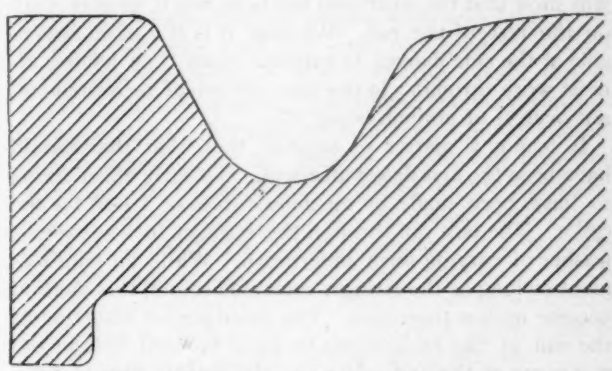
IT is impossible to deal with the tramway system of England without either encroaching upon the information supplied by Mr. D. K. Clarke in his excellent treatise upon the subject, or borrowing therefrom. Before dealing with the matter, we must therefore refer to this source much of what follows.

When it is remembered that the English system does not compare in mileage with that of this country, we are at first disposed to anticipate that there is not much to be learned from the smaller system. As will be seen, this is far from being the case. The more crowded population available as passengers, together with the large amount of capital always at the disposal of a safe investment at a reasonable interest, have combined to secure in England a class of construction which for permanency is not excelled, if equaled elsewhere. The natural conservatism of the country will largely explain the more gradual growth of the system, as compared with its growth here.

In England, tramways are jealously hedged around with provisions against the slightest interference with the passage-way of the streets.

It is known that the step rail has never found favor there. The little that was used was quickly taken up. The conditions that have made the step or tram-rail a necessity in this country, viz.: the indifferent, if not bad condition in which the streets are kept up, do not exist there, where the streets are kept in almost perfect condition.

This form of rail gave way to one, the top surface of which was level with the street, and in which the passage of the wheel flanges was provided for by a groove. See illustration.



The rail here shown was laid very much as the present tram is laid in this country. Cross-ties were laid; on these were placed longitudinal stringers to which the rail was spiked. The stringers were braced against the ties by the use of cast iron brackets.

And herein lays the fact which has prompted the following discussion—where England *commenced*, we *remain*.

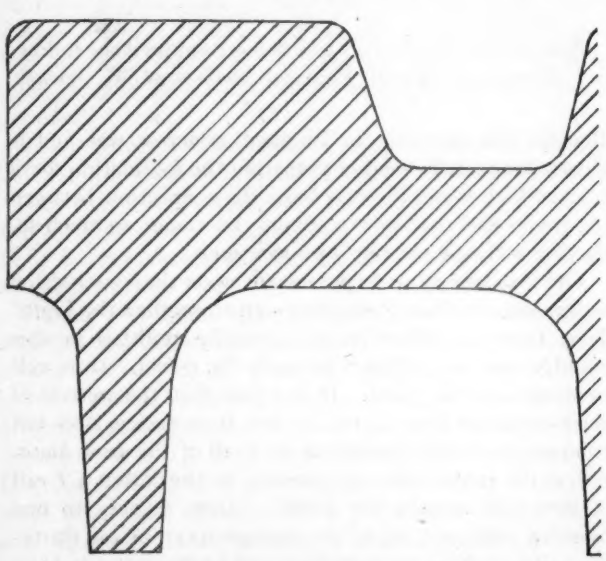
Beyond the fact that in England, concrete was and is almost universally used in preparing the foundation for a track, which is not the case here, the connection between the tracks and road-bed is about the same; so much so, that we will deal entirely with the track.

The first step as an improvement upon the construction noted, was an effort to improve and strengthen the joints. That these are defective, is generally admitted in this country, but few realize how costly the defect. It is well to touch on this point. It is a fact that the amount of wear obtained from a rail in the tram system does not compare with that obtained from a rail of the same material in the steam railroad system. In the latter, a T rail of steel will sustain the traffic of from seventy to one hundred million tons, at an average speed of say thirty-five miles an hour for passenger, and twelve miles an hour for freight traffic. A good quality of iron will, under similar conditions, sustain a traffic of forty-eight millions of tons. Reducing this to weights and speeds current in street railroad practice, and allowing for an excessive street traffic, it will be found that a tram-rail of iron, to say nothing of steel, should last very much longer than it does. It is well known to every street railroad man that

excessive wear destroys the ends long before the rest of the rail is worn out. During the writer's experience as a manufacturer, he worked up many hundred tons of condemned tram-rails. It would be no exaggeration to say that of those which came under his notice, the lease of life had been cut short at least twenty per cent. by these defective ends. It is not alone a question of wear at the ends themselves, but that the wear started here extends imperceptibly to the rest of the rail and accelerates its destruction.

The introduction of steel is of comparatively recent date. Sufficient time has not yet elapsed to have worn out many of the steel rails in use. But even in steel the problem is the same. It is only a question of degree. It can be noted by anyone who will carefully examine some of the steel center-bearing rails in use in New York City, that at the joints, the destruction we speak of has already commenced. A straight edge laid on the head of the rail will show that the wear here has been much greater than on the rest of the rail. Whereas it is still more noticeable at the side flanges, in extreme cases they having almost worn through; in one case, by actual measurement, not over ⅜ of an inch being left.

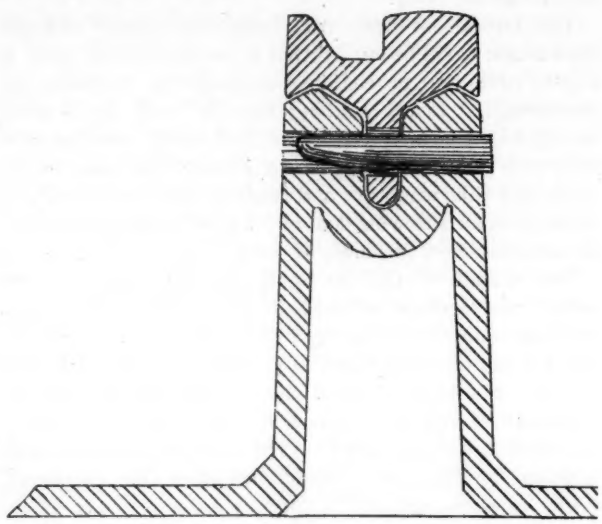
It is not a matter of surprise, then, that this should have been the first defect attacked. An early effort seems to have been made by the substitution of a bolt for the spike. The bolt ran through the stringer to a capacious washer of varying form underneath. While an improvement so long as the stringer remained sound, this method became useless thereafter. The more perfect fastening of the rail at the ends seems to have brought to light the real cause of the bad joints, viz.: the flexible nature of the flat rail; for we find the next step was to make the rail itself more rigid by the use of two projections attached to the base of the rail as stiffeners. See illustration.



The rail thus shown was spiked to the stringer as usual, but a further support was given to the joints by staple spikes, which went through the projection into the stringer sideways.

It is clear that the distribution of metal is here wasteful. A rectangular beam varies in stiffness directly as the breadth, but as the square of the depth. Had the same weight of material been added in the form of one central projection, as in the web of a T rail, the increase of stiffness would have been over twice as great. Or, which amounts to the same thing, a smaller amount of metal thus disposed, would have given the same increase of stiffness. Hence we are led to the next step, which was the change here outlined as advisable.

The greater stiffness thus obtained, together with the simple form of construction, paved the way for the displacement of the timber stringer. The rail was supported on iron chairs placed at regular intervals, and held down to same by a key. See illustration.

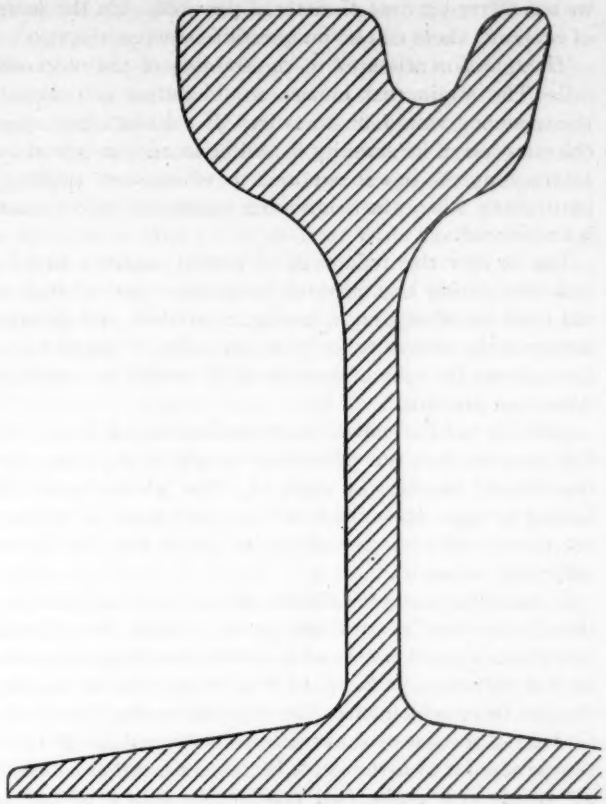


The transition to this type was quickly effected. In fact, the advantage of the change seems to have been at once perceptible. At this point, a halt seems to have been made, and modifications of the same general type seem to have been the tendency. It is natural that with the displacement of the timber stringer, a pause of satisfaction should have occurred. The achievement merited a rest.

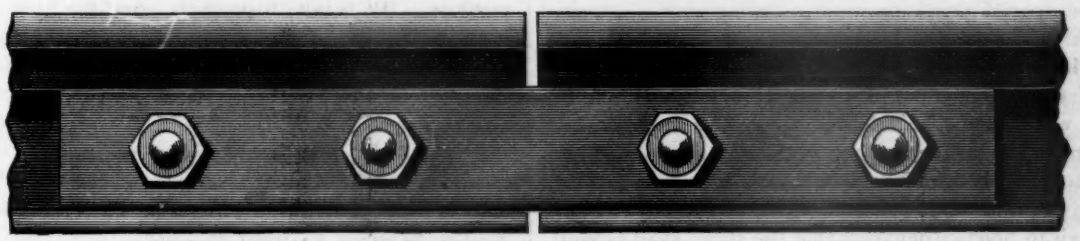
Continuing our analysis, the main defect in the type of rail now before us seems to be the use of the key as a fastening. It may be accepted as a rule that no rail fastening which depends upon a key, is trustworthy. It is not so much a question of strength, as of resistance to impact or concussion. Even where such joints are machine-fitted, they are liable to work loose; still more so if contact with rough castings is depended upon. Even with the greatest care in moulding to produce a smooth surface, some minute projections or roughness will remain. These bind the key on its being driven home, and let it be driven in ever so hard, appearing firm and immovable, its becoming loose is a question of a very short time. The proper fitting of a key or wedge is one of the most difficult tasks of the mechanic. So we often find the use of hard wood urged as a key, or, as an alternative, the use of a smaller key driven into a wood filling. Such a fastening is utterly unreliable, owing to shrinkage and decay of the wood. It was the writer's task, for some years, to care for massive machinery, in which heavy gear wheels were fastened to their center by this means, and he "speaks out of the fullness of the heart" on this subject.

We are not surprised, then, when we are brought to the

form of rail which is now the accepted type of a modern street rail. See illustration.



In it the joint can be effected by the splice-bar or fish-plate, as in the steam railroad system, which form is to-day accepted by all parties as being the best in use.



In this rail the height varies from seven to eight inches, the base is thrown below the surrounding paving sets, and is broad enough to support same. The rails are laid directly on cross ties, and spiked thereto. The good points of this style of rail are at once evident.

With perfect joints, a rigid and smooth running track, and no stringers, ultimate economy seems assured, even regardless of first cost. Indeed the saving effected yearly, and the long life of such a track, must justify a large first expenditure. That such a rail is more costly to make, and, therefore, higher priced, regardless of the extra weight, stands to reason. In fact it is upon record that in some cases the groove was planed out in the machine shop, the cost of which can be imagined. It is now made by bending upward the side flange after rolling the rail. Among other advantages is the greater comfort to the passengers of such a track. The writer remembers noting this while riding on a small suburban tramway running to Briton Ferry, in South Wales. It is no small point. Granting two competing lines, one laid with such a rail and the other with the present tram, there can be no question that the smoother track would draw travel from the other line. Mr. D. C. Clarke seems to have condensed the whole problem in the following words: "It is apparent that a first rate rolling surface is of the essence of a tramway, and it is not well to study too closely the mere element of first cost, in the amount of which for efficient systems of tramway, the variation is not of very considerable importance. Nor is there much difference in the cost of maintenance, from three to six per cent. of the total working expenditures. The practical value of a good rolling surface on the other hand *can scarcely be overestimated;* for the running and car expenses are influenced to a very great extent by the condition of the surface, and *they* (the running and car expenses) constitute nearly *two-thirds* of the total working expenses."

To put it otherwise, the one is an *investment*, the other a *yearly expense*. Having thus briefly outlined the development of the English system, and conceding, as we must, its advance over our own, the question occurs, "why this difference?" We think the answer can be found in the fact that in America the tramway waits on the population, and therefore commences under circumstances necessitating the greatest economy in first construction. In England, the population awaits the tramway, and therefore a perfect system, almost regardless of first cost, is justified from the beginning. It is, however, the fact that in some of our oldest and most thickly populated cities the condition exists almost as in England, and, so far as these points are concerned, there must be found some other causes. There can be but two.

First. A conservatism averse to change.

Second. The failure to realize the real economy belonging to a more perfect track in the *yearly* saving in running expenses.

Let us look a moment at this. Take the one question of cars alone. A line, say five miles long, is running under a 2½ minute headway. It has thirty cars en route at an average speed of four miles an hour as a minimum, calling for a plant of say fifty cars, with reserves. Taking eight years as an average life, this represents an annual cost of $1,250 per year per mile. Judging from personal observation of the difference between English and American practice, and remembering that it is not customary here to carry outside passengers as in England, we think that it would be reasonable to add at least one-half to the life of the cars for the more perfect track. If so, this would effect a yearly saving of $417 per mile, regardless of the yearly repairs put upon the cars. Of course such an estimate can only be a mere guide in the matter, but it at least indicates that the question has a value.

The question of track construction, however, is not to

be dwelt upon in its bearings upon lines of this class, but rather upon that class to whom first low cost is imperative, by far the largest class. Before the English system can be adapted to American use, its first cost must be decreased.

The problem seems to admit of solution. As with this type of rail the track consists only of the rail, we will deal entirely with that.

For reasons already given we must retain the tram or step form for the head. Municipal regulations enforce generally a width of about five inches. This first point in the problem is settled for us.

Next we will look at the base. We think the width of this can be decreased. In England it supports the adjacent pavement. There this is both necessary and advisable. Necessary, because the head being narrow and flush with the street, most of the street traffic adjoining the track runs on this part of the paving; and advisable, because the rest of the street is kept in such thorough repair that a full measure of support can be depended upon from it. Here neither of these conditions exist. The step rail provides a passage way for the wagons. And the argument that sanctions this seems to us a wise one. The traffic has to be provided for in either case. How shall we provide for it? Give it a steel way or let it run on the roadway. Steel will long outwear the most perfect roadway, and, therefore, seems to us the cheapest thing to use. Those who complain of the rapid wear of their rails by the street traffic do not think how much more rapid would have been the wear of the adjacent street if such had supported this traffic, as it otherwise would, and how much more costly the maintenance thereof would have been. So, providing for this traffic on the rail, we need not provide for it again on the adjacent road bed. It is true, paving here should be good under all circumstances, but the special provision we are dealing with is not also necessary.

Neither does the second condition exist. Here the repair of the streets is not as perfect as in England, and no matter what means be adopted to protect the road-bed adjacent to the rail, the support of the rest of the road-bed is not to be looked for here to the same extent as in England.

American practice demands that the street shall support the rail, not the rail the street.

We will assume then that we can reduce this base, say to three inches width. There now remains the question of height.

In this are two points to be considered. First we want ample stiffness; and, second, where paving sets or blocks are used, we want the cross-ties thrown below the same.

As to the first consideration, we have two known elements in the case. A head of a given form, five inches wide, and a base of a given form, three inches wide. We add to this the vertical stem or web, making it a girder. With a total height of 4½ inches we secure a stiffness that is three times as great as that of a 45 lb. tram-rail laid down on a 5x9 stringer. So far as stiffness is concerned this suffices. Considering the second point, that of throwing down the cross-ties, there are only two means before us. The use of the 4½ inch rail, with an iron chair between it and the cross-tie, or the deepening of the rail itself, as in the English system. Mechanically both will answer. It then becommes a commercial question. We find that by using the chair we can secure our object by the use of 7¼ tons of material to the mile. If we do so by deepening the rail, we use thirty-six tons of material per mile. On the score of economy there can be no question between the two.

The question arises as to the stability of the proposed rail. The strain that impact would induce is torsional, the tendency would be to twist. If a doubt arises upon the question of its stability it will be at once removed by ascertaining the power required to effect such twisting, particularly when the continuous nature of such a track is considered.

Taking now the reduction in weight outlined herein, and considering that against the greater cost of such a rail must be offset a large saving in lumber, and greater saving in the cost of labor in construction, it seems feasible to bring the cost of such a track within the reach of American practice.

And, as before stated, once rendered feasible in the first construction, the permanent yearly saving is a point that should not be lost sight of. The whole benefit of having brought down the first cost, will consist in rendering this yearly saving available to those who could not otherwise secure it.

In operating a street railroad, the question of construction is one that occurs only every sixteen or eighteen years with a given track; whereas the operating expenses, such as collection of fares, feed of stock, time of transit, etc., are those which affect the financial results every year. So long as the question of track is considered purely from the standpoint of first cost, it becomes a fact that so small an article as a register or conductor's punch is, and is properly, a more important question to the street railroad man. If the discussion of the matter has demonstrated that the problem is one that deserves to be classed with that of the article mentioned, it will have achieved its purpose. We think to properly consider it, it becomes both a question of first cost and permanent saving. It cannot become the latter until it has reduced the former.

The Street Railroad Problem.

SAN FRANCISCO, October 6, 1883.

Editor American Railroad Journal:

In the article on "the Street Railroad Problem" in your issue of August, after enumerating the various means of street car propulsion, and making some reference to the trials of various plans, you allude kindly to the cable system, and pertinently ask why, after ten years of use, the cable system is so far from being generally adopted by tramway companies. It is natural, I believe, for corporations to be rather conservative in regard to the expenditure of large sums of money in any, to them, untried experiment, and especially when the cost of an experiment is much greater than the original capital of the company or organization. This applies more particularly to railway corporations perhaps than to any other. They have to consider, not only an increased revenue or a decreased expense account, but the regularity and positiveness with which their particular business is transacted, and that is the carrying of passengers and freight. Let some one approach a railway company with a proposition to reduce the cost of carriage or the operating expenses 10, 15 or 30 per cent., and although it will have attention and careful

examination, the trial question of importance is, what is the liability of this new arrangement to interfere with the prompt despatch of trains, or what chances are there that trains may be delayed en route? If this bears an appreciable percentage against regular despatch, it is a fatal objection. But let it be demonstrated that with other advantages more regular despatch can be had, more promptness in arrival and departure, greater capacity over the same length of road and a reduced cost of operating expenses, then will the cost of an experiment be a small factor. It is well known that a vast number of inventions relating to railways are patented already, and a great number patented each year, and yet but few of them come into general use. It is only after years of experiment and trial and struggle with the varying conditions, that the most meritorious and important gradually become known, adopted and appreciated. And in this position stands the cable system for tramways. Nearly forty years ago this system was patented, but the engineer was too far ahead of his time, and again was it patented twenty-five years ago. Even that was too soon, for the opportune moment had not arrived, and did not arrive until the star of empire marched Westward from the Atlantic to the Pacific and brought to the golden West the ambition and energy and knowledge and skill of all the world, with men who never admitted the word fail in any enterprise, and whose independence of thought and action made them free from the trammels of older associations. A suggestion was no sooner made than minds at once instinctively turned to the solution of any problem. And when our city of San Francisco had grown so that the homes of its people were North and South, in the valleys and were pressing up and over the hills to the West, and tramways were constructed to take people from one end of the city to the other, some of which had to pass grades perhaps steeper than in any other city would have been considered practicable, the natural humanity of man came forth for the protection to animals, and a suggestion that some plan could be studied up that would relieve them from the cruelty, evolved the construction of the Clay Street Hill Railroad. This modest and unpretentious beginning was but the dawn of a new era in tramway propulsion, for since then other roads have either been converted or newly constructed, and are now operating to the extent of about fifty miles, and Chicago has taken the initiative East of the Rocky Mountains, and it is hoped that with the commencement in Philadelphia, the system will be extended to the far East.

The writer having been connected with the cable tramways of San Francisco for the past six years and over, has made a study of this plan of propulsion, and it needs no extravagant assertions to make it a matter of great interest to tramway companies, for if all the disadvantages of this system could be shown side by side with its advantages, the latter would preponderate to such an extent that the former would seem insignificant; and as an earnest advocate of its adaptableness to many localities, the writer is desirous that a knowledge of this system of propulsion should be disseminated. The general or popular idea seems to be that the system is intricate and that there is something mysterious about it; but it is not so, perhaps not half so difficult as was the unsolved problem of hauling a train of cars by a locomotive that had smooth drivers and no teeth along the rail to keep the wheels from slipping. While the general features of the system are applicable to any localities requiring this means of propulsion, modifications of the details are needed to meet the changing conditions of streets, roads, climate, traffic, etc. The streets in San Francisco are hilly; in Chicago, level, but both straight. In New York and other places East, as well as Chicago, snows and ice are prevalent, while the temperature is mild in San Francisco. In London, where the writer was engaged in designing the plans for the Highgate Hill Tramway, the streets are mostly all crooked, and that with other local conditions varied so much from San Francisco that scarcely one of the details in the latter place was suited to the road in London. In order that a road or cable tramway may be constructed in any desired locality, it is proper that all the conditions which occur in that locality should be known, and must be known, before an engineer undertakes to lay down plans for the construction of such a road. The one great object to be attained is the running of a rope and having a grip attached to a car so that the rope can be attached to the grip and yet travel in the tube underground without coming in contact with any of the sheaves necessary for supporting the rope, and diverting it to such directions as may be necessary to suit the direction of the street above. A tube for the rope to travel in can be constructed of any desired dimensions, with a slot in the top, the strength of the tube can be made to meet any possible requirements, and car tracks can be run above ground in any direction.

Various facts have come to light during the experience of cable tramway propulsion in San Francisco and Chicago, and such of these as may be of interest, I will add in another letter.

W. W. HANSCOM.

Fowler's Improved Safety Fare-Receiving Box.

Robberies of fare-receiving boxes, by petty pilferers, through the aid of flexible rods and other similar devices, known to the craft, have given rise to such an unvarying and incessant complaint, on the part of persons and corporations employing them, on railways, tramways, in omnibuses, etc., that the skill of the inventor has been invoked with a view to interposing an impediment, and providing an effectual check to this constant outgoing flow; and many and very expensive devices and methods have been contrived, designed and suggested, apparently without success. Among the best of the many devices and suggestions, are those boxes having internally arranged directing plates, set inclining downward toward the safe, at diverging angles, and alternately on opposite sides, but these, (owing to the fact that they present a plain surface) instead of proving wholly efficacious have

been utilized by the thief to aid him in directing his wire, flexible rod or other aid on to the money, until the users of the box come to think it is almost impossible to put a stop to the robberies. This however, Mr. T. W. Fowler of Washington, D. C., has effectually done by his patent, partially shown by the accompanying cut.

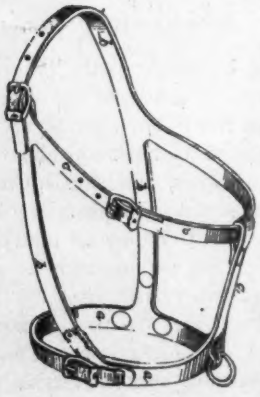
Instead of the plain directing plates, as now in use, Mr. Fowler introduces into the fare-receiving box, one, two or more foraminous (perforated) directing plates, secured by one end and the sides, on the inside of the box, on the opposite sides thereof, the free ends of the plates directed downward, toward the opposite side of the box, so that the plates will stand at diverging angles from each other.

These plates may be made of any character of material, and the entire surface is so perforated with slots or other forms of holes, that a wire or rod, that could be bent in any shape to pass over the end of the plate, would pass down through the foramina, so that even if it could be directed on to a fare, or money, in being withdrawn it would be wholly stripped, and then the line of perforations at the lower end of the plate are carried out into slots, so as to form numerous fingers on the lower edge of the plate, over which it would be utterly impossible to carry a wire with anything on it.

The upper plate, if preferred, may be made integral with the fare-receiving mouth, but this is not necessary.

The great advantages presented by this patent are, its extreme simplicity, its cheapness, and the facility by which it can be introduced into any of the fare-receiving boxes now in use. These plates can be cast of glass, stamped out by machinery, or cast of any character of metal, and at a very trifling expense.

An Improved Halter.



THE Triumph Halter, patented by R. H. Armstrong, of Hudson, Michigan, July 24th, 1883, Patent No. 281,952, is made of one piece of leather, without a stitch, making it stronger than a sewed halter, an advantage well known to horsemen.

The straps are cut with the grain of the leather, and parallel to each other. There is no scrap or waste leather made in cutting. With the aid of two small stay-plates, on the sides, it forms a perfect halter, with all the essential features of a five-ring halter, taking forty-two inches less leather to make it. It is adjustable to all sizes of heads.

The advantages claimed for this halter are the great saving of time in its construction, dispensing with sewing and rings, a great saving in leather, and that it is a stronger and better looking halter than any other.

For territory or shop rights the reader is referred to the inventor and patentee at Hudson, Lenawee Co., Mich.

THE horseshoe, invented and patented by Frank C. Rollins, of Weld, Maine, is so designed that the calk can be renewed easily without taking the shoe from the horse's foot. Its patentee's claim is the combination, with a horse-shoe having on its under side, at the front end, a transverse dovetailed recess, tapering or wedge-shaped in direction of its length, and having at its wide or front end a notch communicating with the nail-groove, in combination with the toe-calk having on its upper side a dovetailed wedge-shaped cleat extending at the front end, so as to form a point adapted to enter the notch in the dovetailed recess.

A NEW halter has been invented and patented by J. W. B. Carpenter, of West Medford, Massachusetts. It is made of coils of steel wire, providing a flexible action as near the restraint of the human arm as is perhaps feasible. When there is no pressure it is straight, and keeps the horse about two feet from the post, or wherever else he is fastened. Some are made covered with rubber, and so well adapted for use in bad weather. This unique invention is claimed to be the best thing of its kind, so far.

THE Third Avenue horse cars of this city carry neat little stoves, which stand in zinc-lined boxes of walnut and pine, set midway in one of the rows of seats. The stove occupies the space of an ordinary seat. On days when the fire is not lighted, passengers are said to find comfort in looking at the stove.

THE Prescott Manufacturing Co., of Boston, whose hangers for heavy doors are widely and favorably known, have perfected hangers for the doors of street cars, and a large number have already been ordered for some of the Boston street railroads.

List of Recent Patents for Inventions Relating to Tramways.

BEARING DATE OCTOBER 2, 1883.

285,814. FEED-BAG FOR HORSES: James H. Hey and Alois N. Verdin, Cincinnati, Ohio. Filed June 21, 1883.

285,976. REIN-HOLDER: Jos. K. Craig, Canton, Ohio. Filed Feb. 23, 1883.

286,004. HARNESS ATTACHMENT: Sylvester Hemphill, Belmont, Wis. Filed April 18, 1883.

286,010. COMBINED COLLAR AND HAME: Moses Humber, Calliope, Iowa. Filed March 7, 1883.

286,044. CABLE RAILWAY: William McCall and John V. De Vry, San Francisco, Cal. Filed Sept. 18, 1882.

286,163. GRIPPING AND CARRYING APPARATUS FOR CABLE RAILROADS: Henry Root, San Francisco, Cal. Filed Feb. 13, 1882.

BEARING DATE OCTOBER 9, 1883.

286,189. ADJUSTABLE TOE-WEIGHT FOR TROTTING HORSES: Cyrus H. Etter, Medford, Mass. Filed Aug. 3, 1883.

286,190. TOE-WEIGHT FOR HORSES: John H. Fenton, Chicago, Ill. Filed Jan. 2, 1883.

286,228. ENDLESS-CABLE GEARING: William B. Ross, Lyons, N. Y. Filed March 15, 1883.

286,257. STREET-CAR-DOOR MECHANISM: Fredk. B. Brownell, St. Louis, Mo. Filed July 31, 1882.

286,260. CHAFE-PAD FOR HARNESS: Charles W. Burgtorf, Petaluma, Cal. Filed May 17, 1883.

286,319. QUARTER-BOOT FOR HORSES: James G. Lightford and John H. Fenton, Chicago, Ill., assignors to said Fenton. Filed Sept. 18, 1882.

286,347. HARNESS-SADDLE: Samuel E. Tompkins, Newark, N. J. Filed Dec. 8, 1882.

286,349. PASSENGER-REGISTER: Louis A. Touchet, Cambridge, Mass. Filed July 17, 1883.

286,389. HORSESHOEING-STAND: Wiley D. Coffey, Pangburn, Ark. Filed July 12, 1883.
286,435. HARNESS-PAD: John Frederic Hessel, Champaign, Ill. Filed Jan. 20, 1883.

BEARING DATE OCTOBER 16, 1883.

286,602. HALTER: Albert G. Garfield, Chicago, Ill. Filed April 18, 1883.
286,640. HORSESHOE: Frank C. Rollins, Weld, Me. Filed Jan. 19, 1883.

BEARING DATE OCTOBER 23, 1883.

287,024. HORSESHOE: Thomas Head, Lowell, Mass. Filed Dec. 30, 1882.
287,031. REIN-HOLDER: William S. Laney, Baltimore, and Charles F. Yost, Canal Winchester, Ohio. Filed March 27, 1883.
287,094. STATION-INDICATOR: William W. Campbell, San Francisco, Cal. Filed Aug. 4, 1883.
287,125. TRACE-BUCKLE: Dickson T. Harbison, Duncanville, Ill. Filed March 15, 1883.
287,220. CONDUIT FOR TRACTION-ROPE RAILWAYS: Adolphus Bonzano, Phœnixville, Pa. Filed Sept. 24, 1883.
287,280. OVERSHOE FOR HORSES: Benjamin Greenaway, Louisville, Ky. Filed July 30, 1883.
287,341. HOSE-JUMPER: Wm. B. Thomas, Philadelphia, Pa. Filed July 2, 1883.
287,377. ENDLESS-CABLE GRIP, ETC.: Aiken Haman, San Francisco, Cal. Filed March 3, 1882.

BEARING DATE OCTOBER 30, 1883.

287,411. TRACK-CLEANER: John Birnbaum and John T. Richmond, Cincinnati, Ohio, assignors of one-third to George J. Birnbaum, same place. Filed Jan. 8, 1883.
287,497. RIM-PLATE FOR HORSE-COLLARS: William L. Bellis, Cleveland, Ohio. Filed Sept. 11, 1882.
287,577. CRIBBING-PLATE: August Quinque, Harleysville, Pa., assignor to himself and J. Reinhart Z. Keelor, same place. Filed Aug. 29, 1883.
287,644. SEAT FOR STREET-CARS: William Don, New York, assignor to William White, White Plains, N. Y. Filed July 12, 1883.

LITERARY NOTES.

No. 1, Vol. I., of the *Journal of Progress, Wood-Worker and Machinist* is the beginning of an experiment which we hope will prove a success. Its orignal contents are useful and interesting, and its selections well chosen and well edited. This "representative journal of the wood-working interests in all its branches" is neat and attractive in appearance. Its "unpretentious design of being useful, both to the manufacturers of wood-working machinery and the buyers thereof," is certainly accomplished in the initial number, and the *Journal of Progress*, which is destined to fill an important part among the industrial activities of the age, is every way worthy of the God speed with which we hail it. Philadelphia: Jno. H. Bentley, No. 922 Holly street.

"The Heart of the Continent," published by the Passenger Department of the Chicago, Burlington and Quincy Railroad, is an historical and descriptive treatise for business men, home seekers and tourists, of the advantages, resources and scenery of the Great West. It has more than sixty neatly printed pages, freely illustrated, is well written by a well-informed pen, and is quite a keepable little pamphlet.

A similar production is the "Landscape Wonders of the Western World," from the same enterprising department of an enterprising railroad. Such little books, albeit published for business purposes, have great value in spreading useful information, and giving substantial pabulum to that spirit of patriotism which all good Americans strongly feel. The pamphlet before us contains a large and well executed map, increasing both its beauty and utility.

The "Great Burlington Route," the transcontinental route of America, completes our present notices of the excellent advertising done by the C. B. & Q., in the way of announcements, by means of well skilled literary and art work, published in a pleasing form. Colored illustrations are a feature of this very pretty production.

The *Memory Manual*, by George Yule, lecturer on memory, gives for a small price, a system which, as used by himself, develops astonishing results. Naturally he has a poor memory, but by the association of ideas, after the plan invented by him, his capability of remembering dates, rows of figures, arbitrary arrangements of words, etc., is phenomenal. His interesting little work, which sells at a dollar a copy, is published by the author, care of William Knowles, No. 104 East Thirteenth street, New York.

"How to Build, Furnish and Decorate," is a work which is well conceived; treating of subjects interesting to readers of every social condition. Examining it closely as to its contents, we find it exceedingly satisfactory, what it undertakes to do, as stated in its title page and well-written preface, being carried out with exemplary conscientiousness. The owner of this singularly valuable work has, in its first part alone, elevations and plans of 126 houses, making 349 illustrations in all, accompanied with a carefully prepared description of each building. "Furniture and Decoration" is the title of the second part of the work, which is beautifully illustrated, and gives, among other things, a statement of the principles which underlie the effective and artistic treatment of interiors. Specific directions, covering a wide range, and of service to the reading public universally, are given in large and pleasant pages, and expressed in clear and graceful English. The tone and spirit of the work throughout are admirable, and equally as marked in its third and last department, that on "Barns and Outhouses," as in the earlier portions of the volume. In short, the book under review is a highly practical, sensible and satisfactory work, unique in its completeness, and wonderfully cheap at the price at which it is sold. New York: The Cöperative Building Plan Association, No. 24 Beekman street.

The Harlan & Hollingsworth Company, Wilmington, Del., is building a state coach and a sleeping car for the president of the Argentine republic in South America.

The Taunton Locomotive Works are at work night and day on a large order just received for the Union Pacific Railway.

A new passenger locomotive has just been furnished for the Eureka Springs Railway by the Rogers Locomotive Works of Paterson, N. J.

The Ohio Falls Car Company has a contract for a number of caboose cars for the Pennsylvania Company, and has commenced work upon them.

New Inventions.

TO INVENTORS.

THIS department of the JOURNAL is devoted to descriptions of new inventions applicable to railroads. We publish each month a list of the same, and invite each inventor to forward us a description of his invention, believing the publication of facts regarding them will be perused with interest by railroad men, and all interested in the development of our railroad system. *We make no charge for publishing these.*

Descriptive articles relating to Tramways will be placed in that department.

List of Patents for Inventions Relating to Railways, Machinery, Etc.

BEARING DATE OCTOBER 2, 1883.

285,787. CAR-COUPLING: William B. Bessey, Elmira, N. Y. Filed May 26, 1882.

285,789. CAR-COUPLING: Kirk S. Blanchard, Clarendon, N. Y. Filed Feb. 24, 1883.

285,798. INDICATOR AND ALARM FOR STEAM-BOILERS: Edward J. Coffin, Little Falls, N. Y. Filed Aug. 15, 1883.

285,812. REVERSING-GEAR FOR STEAM-ENGINES: Martin E. Hershey, Harrisburg, Pa. Filed Aug. 9, 1883.

285,813. CAR-COUPLING: Louis Herrman, Boston, Mass., assignor to Mary Herrman, same place. Filed July 2, 1883.

285,828. FUEL-MAGAZINE FOR STEAM-GENERATORS: George Mehring, Chicago, Ill. Filed July 2, 1883.

285,833. RAILWAY TIE AND STRINGER: John Newton, Clifford, Ind. Filed Feb. 23, 1883.

285,842. RAILWAY METALLIC CROSS-TIE AND TROUGH: Geo. L. Putnam, Mount Vernon, N. Y. Filed Feb. 6, 1883.

285,843. MAINTAINING PRESSURE IN SUPERHEATERS: David Renshaw, Braintree, Mass. Filed Feb. 24, 1883.

285,846. STEAM-JET CONDENSER: Louis Schutte and John Goehring, Philadelphia, Pa.; said Goehring assignor to said Schutte. Filed May 12, 1883.

285,849. SPARK-ARRESTER: Howard M. Smith, St. Louis, Mo. Filed April 7, 1883.

285,857. ELECTRIC MOTOR: Charles J. Van Depoele, Chicago, Ill. Filed Dec. 23, 1882.

285,858. ELECTRIC RAILWAY: Charles J. Van Depoele, Chicago, Ill. Filed Jan. 15, 1883.

285,865. VENTILATING APPARATUS: Levi J. Wing, Brooklyn, N.Y. Filed Jan. 5, 1883.

285,867. TICKET-PUNCH: Robert Woodman, Malden, Mass. Filed Aug. 15, 1883.

285,880. LANTERN: Frederick Dietz, New York, N. Y. Filed Oct. 10, 1882.

285,890. SLEEPING-CAR: Henry S. Hale, Philadelphia, Pa. Filed July 5, 1883.

285,892. STEAM-ENGINE GOVERNOR: Charles S. Haskell, Philadelphia, Pa. Filed Sept. 29, 1882.

285,899. SPARK-ARRESTER: George D. Hunter, Terre Haute, Ind. Filed Aug. 7, 1883.

285,900. SPARK-EXTINGUISHER: George D. Hunter, Terre Haute, Ind. Filed Aug. 7, 1883.

285,904. STEAM-ENGINE: Jacob Kaiser, Brookline, Mass. Filed July 10, 1883.

285,906. AUTOMATIC CAR-COUPLING: Michael Kennedy, Troy, N. Y. Filed March 5, 1883.

285,913. CAR-COUPLING: Isaac J. Merrick, Conotten, Ohio. Filed June 21, 1883.

285,920. TORPEDO-SIGNAL FOR RAILWAYS: Timothy G. Palmer, Schultzville, N. Y. Filed April 2, 1883.

285,944. AUTOMATIC ELECTRICAL RAILWAY-SIGNAL: Daniel H. Applegate, Red Bank, N. J. Filed May 10, 1883.

285,951. RAILROAD-GATE: Ira L. Ballard and John W. Craig, Mechum's River, Va. Filed March 14, 1883.

285,955. STEAM-VALVE: Thos. P. Barry, Stillwater, N. Y. Filed Mar. 13, 1883.

285,975. GUARD FOR CARS: John Craig, San Francisco, Cal. Filed Feb. 21, 1883.

285,984. CAR WHEEL AND AXLE: John Findlay, Montreal, Quebec, Canada. Filed Nov. 21, 1881.

285,986. RAILROAD-TIE: Clark Fisher, Trenton, N. J. Filed June 5, 1883.

285,994. DUST-GUARD FOR CAR-AXLE BOXES: Nathan M. George, Danbury, Conn. Filed June 11, 1883.

286,001. CAR-COUPLING: Lars G. Hedlund, Rothsay, Minn. Filed Aug. 2, 1883.

286,002. CUT-OFF VALVE: Thaddeus W. Heermans, Chicago, Ill. Filed March 5, 1883.

286,042. CAR-SPRING: Thos. J. Mayall, Reading, assignor to the Brunswick Antimony Company, Boston, Mass. Filed March 19, 1883,

286,054. CAR-COUPLING: Thomas R. Morgan, Guy Ruf, and David Davis, Jackson, Ohio. Filed June 28, 1883.

286,061. CAR-COUPLING: Robert T. Payne, Warm Springs, Va. Filed July 28, 1883.

286,062. VALVE-GEAR FOR STEAM-ENGINES: Richd. W. Peck, Brooklyn, N. Y. Filed March 27, 1882.

286,080. CAR-COUPLING: Charles Philander Searles, Columbus, Ohio, assignor of one-half to George W. Butler, same place. Filed Aug. 7, 1883.

286,098. CAR-AXLE LUBRICATOR: Jean F. Webb, Lebanon, Ill. Filed July 12, 1883.

286,102. ROTARY STEAM-ENGINE: Augustus B. Wood, Fountain Hill, Ark. Filed May 13, 1882.

286,122. RAILWAY-SIGNAL: Henry H. Eatherton, Monticello, Ill., assignor of one-half to Asa C. Thompson, same place. Filed May 12, 1883.

286,127. AUTOMATIC CAR-BRAKE: Samuel S. Fuller and Robert Salvadge, Stratford, Ontario, Canada. Filed March 21, 1882.

286,148. SAFETY-VALVE: Alexander Orme, Chicago, Ill. Filed July 7, 1883.

286,156. RAILROAD TIME-SIGNAL: Stephen J. Swayze and John C. Lane, Sag Harbor, N. Y. Filed April 7, 1883.

BEARING DATE OCTOBER 9, 1883.

286,175. CAR-COUPLING: Wendell Carter and Henry T. Woods, Boston, Mass. Filed April 6, 1883.

286,183. CAR-WHEEL: William B. Dixon, Springfield, Mass. Filed March 31, 1883.

286,197. FREIGHT-CAR: Arthur Grundy, New York, N. Y., assignor to himself, Henry A. Landgraff, and Edmund Tapscott, same place. Filed Nov. 2, 1882.

286,198. CAR-COUPLING: John E. L. Harbold, Worthington, Ky. Filed April 18, 1883.

286,207. CAR-COUPLING: Arthur Lenhart, Portland, Oreg. Filed Oct. 30, 1882.

286,249. MECHANISM FOR PLACING TORPEDOES ON RAILWAY TRACKS: Samuel F. Allen, Chicago, Ill., assignor of two-thirds to Thomas R. Freeman and James S. Toppan, same place. Filed June 14, 1883.

286,268. ELECTRIC SIGNAL FOR RAILWAY-TRAINS: Edward R. E. Cowell, Detroit, Mich., assignor to himself, Lewis Mann, E. C. Brown, and Robert Miller, same place. Filed Aug. 2, 1882.

286,271. CAR-COUPLING: George W. Cross, Gardiner, Me., assignor to Edwin Ingram, Philadelphia, Pa. Filed Aug. 6, 1883.

286,298. TRACK-DRILL: Eli S. Hart, Clinton, Iowa. Filed May 11, 1882. Renewed Aug. 29, 1883.

286,307. CAR-COUPLING: Henry L. Johnstone, Palmetto, Ga. Filed Aug. 23, 1883.

286,341. HEATING, VENTILATING, AND DRAFT-REGULATING APPARATUS FOR RAILROAD-CARS: James Spear, Philadelphia, Pa. Filed April 14, 1883.

286,352. TICKET-DISTRIBUTING BOX: Samuel B. Whitehead, San Francisco, Cal. Filed July 18, 1882.

286,353. CAR-BRAKE: Chas. D. Whiting, Chicago, Ill. Filed Aug. 9, 1883.

286,381. DEFLECTOR FOR RAILROAD PASSENGER-CARS: Alexander W. Brinkerhoff, Upper Sandusky, Ohio. Filed Dec. 29, 1882.

286,420. STEAM-WHISTLE: James E. Gause, Brownsville, Tenn. Filed April 10, 1883.

286,444. CAR-COUPLING: Edwin Ingram, Philadelphia, Pa., assignor to the National Automatic Car Coupler Company, of New Jersey. Filed July 6, 1883.

286,465. RAILROAD-SCALE: John L. Merrill, Pottstown, Pa. Filed Sept. 3, 1883.

286,470. SLIDING CAR-DOOR: Edward Y. Moore, Chicago, Ill. Filed Aug. 9, 1883.

286,473. LUBRICATOR FOR STEAM-CYLINDERS: Thos. A. Naylor, Baltimore, Md. Filed July 26, 1883.

286,480. CAR-COUPLING: Henry A. Palmer, Villisca, Iowa. Filed July 20, 1883.

286,482. STEAM-ENGINE: Joseph F. Pond, Cleveland, Ohio. Filed March 5, 1883.

286,492. CAR-COUPLING: George C. Short and William L. Roe, New London, Conn., assignors of one-fourth to Albert G. Davidson, same place. Filed Aug. 31, 1883.

286,493. CONDUCTOR'S FARE-RECORDER: James C. Shoup, St. Louis, Mo. Filed Feb. 26, 1883.
286,514. CAR-SEAL: John S. Wertz, Stanberry, Mo. Filed Dec. 19, 1882.
286,563. JOURNAL BEARING AND BOX: Robert W. Traylor, Richmond, Va. Filed Dec. 18, 1882.
286,564. TRACK-LAYING MACHINE: Ferdinand F. Voigt, Walla Walla, Wash. Filed April 17, 1883.
286,565. CAR-TRUCK: S. Stuart Williamson, Bridgeport, Conn., assignor to A. F. Carman, Brooklyn, N. Y., and S. D. Williamson, Washington, D. C. Filed July 27, 1883.

BEARING DATE OCTOBER 16, 1883.

286,573. BALANCED SLIDE-VALVE: James E. Baker, Madison, Wis. Filed Feb. 17, 1883.
286,575. LIVE-STOCK LOADER: William H. Barnes, Independence, Kans. Filed July 21, 1883.
286,578. CAR-COUPLING: Walter K. Berry, Swede Point, Iowa. Filed March 6, 1883.
286,579. LOCOMOTIVE ASH-PAN: Edward Bignell, Lincoln, Nebr. Filed June 4. 1883.
286,585. VALVE-GEAR FOR STEAM-ENGINES: Jacob Braunwalder, Milwaukee, Wis. Filed April 9, 1883.
286,622. CAR-COUPLING: Michael E. McDonald, Scranton, Pa. Filed Sept. 7, 1883.
286,623. RAILWAY-VELOCIPEDE: Ives W. McGaffey, Chicago, Ill., assignor to Everett B. Preston, same place. Filed March 7, 1883.
286,625. DRAFT-PIPE FOR STEAM-BOILER FURNACES: Frederick Mertsheimer, Denver, Col. Filed May 22, 1883.
286,634. SNOW-PLOW: John Phillips, Boone, Iowa. Filed April 7, 1883.
286,635. CAR-COUPLING: John F. E. Phillips, Hannibal, Mo. Filed Aug. 27, 1883.
286,651. RAILROAD-TIE: Enoch L. Taylor, Philadelphia, Pa. Filed Aug. 19, 1882.
286,655. MACHINE FOR STRAIGHTENING RAILROAD-RAILS: Francis H. Treat, Joliet, Ill. Filed Jan. 16, 1883.
286,682. RAILWAY-SWITCH: George Chalmers, San Juan, Cal. Filed Jan. 18, 1882.
286,702. MOTOR; Jas. B. Hunter, Ashley, Ill. Filed March 17, 1883.
286,713. RAILROAD-GATE: Michael H. Lantz, Marionville, Mo. Filed Dec. 6, 1882.
286,745. CAR-COUPLING: William S. Thayer, Owego, N. Y. Filed Sept. 6, 1883.
286,747. CUT-OFF VALVE: Chester B. Turner, Detroit, Mich. Filed Aug. 8, 1883.
286,762. OILER FOR CAR-WHEELS: Howard A. Barrows, Rochester, N. Y., and Robert F. Cummings, Landrus, Pa. Filed April 13, 1883.
286,773. CAR-BRAKE: Geo. M. Brill, Philadelphia, Pa. Filed Feb. 2, 1883.
286,776. CAR-TRUCK: Israel F. Brown, New London, Conn. Filed Dec. 15, 1881.
286,779. SNOW-PLOW: John A. Chisolm, Sauk Center, Minn. Filed Feb. 24, 1883.
286,841. ELECTRIC GOVERNOR: Edward B. Parkhurst, Woburn, assignor to himself and Albert L. Parcelle, Boston, Mass. Filed May 29, 1883.
286,844. ROTARY ENGINE: Nathaniel J. Pritchard, Boyce, Va., assignor of three-fourths to David E. Clark, Chambersburg, Pa., and Charles L. Pagenhart, Boyce, Va. Filed March 29, 1883
286,848. CAR-COUPLING: Joseph Rigby and Samuel S. McHugh, Ottawa, Kans. Filed Aug. 16, 1883.
286,856. ROTARY STEAM-ENGINE: James M. Smelser and Emmett L. Kennedy, Rushville, Ind. Filed Aug. 2, 1883.
286,877. CAR-ROOF: John Walter, Nashville, Tenn. Filed July 27, 1883.
286,895. SNOW-EXCAVATOR: Danthus P. Bier and Henry E. Rolph, Marshall, Minn., assignors of one-third to Henry M. Burchard, same place. Filed June 11, 1883.
286,915. RAILWAY-SIGNAL: Henry H. Eatherton, Monticello, Ill., assignor of one-half to Asa C. Thompson, same place. Filed May 21, 1883.
286,927. JOURNAL-BEARING: David A. Hopkins, Park Ridge, N. J. Filed Jan. 16, 1880.
286,932. MAIL-BAG CATCHER: Joseph Arther Kellogg, Nashville, Tenn. Filed Aug. 21, 1883.
286,985. COMBINED STEAM-ENGINE AND ELECTRIC GENERATOR: Leonidas G. Woolley, Dayton, Ohio, assignor, by mesne assignments, to the Ohio Power and Light Company, same place. Filed June 21, 1883.

BEARING DATE OCTOBER 23, 1883.

286,990. VISE: James O. Barrett, Erie, Pa. Filed Aug. 25, 1883.
286,992. CAR-COUPLING: Robert Bigney, Copleston, Ontario, Canada. Filed July 20, 1883.
286,995. VISE: Charles M. Boyce, Stoneham, Mass. Filed March 15, 1883.
286,999. CAR-COUPLING: Christopher Clarke, Northampton, Mass. Filed Feb. 16, 1883.
287,006. JOURNAL-BOX: George R. Cullingworth, New York, N. Y. Filed Feb. 21, 1883.
287,017. CAR-COUPLING: Ezra N. Gifford, Cincinnati, Ohio. Filed Feb. 1, 1883.
287,036. LIFE-GUARD AND TRACK-CLEARER: Richd. B. Locke, Brooklyn, N. Y., assignor of one-fourth to Charles W. Held, same place. Filed Aug. 21, 1882.
287,051. RAILROAD-SIGNAL: William H. Peddle, Roselle, and Samuel P. Thornton, Elizabeth, N. J. Filed Jan. 4, 1883.
287,069. STEAM-PUMP REGULATOR: Jacob Wagner, Pickering, Mo. Filed July 26. 1883.
287,070. CAR-COUPLING: Edward F. Walker, Providence, R. I. Filed May 9, 1883.
287,079. SIGNAL FOR LOCOMOTIVE HEAD-LIGHTS: Charles Anderson, Ludlow, Ky., assignor to Post & Co., Cincinnati, Ohio. Filed April 4, 1883.
287,084. CAR-COUPLING AND BUFFER: C. Canby Balderston, Westtown, and Charles Balderston, Philadelphia, Pa. Filed June 18, 1883.
287,085. LUBRICATOR: Cyrus W. Baldwin, Chicago, Ill. Filed Aug. 11, 1883.
287,110. CAR-COUPLING: John Burton Draper, Zanesville, Ill. Filed Aug. 21, 1883.
287,130. CAR-COUPLING: Thos. H. James, Republic, Mich. Filed May 19, 1883.
287,147. RAILROAD-GATE: David McNeely and James A. Drake, Princeton, Ind. Filed Jan. 5, 1883.
287,157. FOG-SIGNAL FOR RAILWAYS: Walter S. Phelps, Wortendyke, N. J. Filed Dec. 28, 1882.
287,202. CAR-AXLE: Augustus Walton, San Francisco, Cal. Filed May 14, 1883.
287,203. JOURNAL-BEARING: Edmund R. Ware, Worcester, Mass. Filed March 21, 1883.
287,268. CAR-STOVE: Kinsey Fife and James N. Pickenpaugh, Morgantown, W. Va. Filed May 19, 1883.
287,270. CAR-COUPLING: Charles J. Fortson, Washington, Ga. Filed July 18, 1883.
287,274. RAILROAD-FROG: Alonzo H. Gorton, Oswald C. Patchell, and William E. Gorton, Corning, N. Y. Filed Jan. 9, 1883.
287,289. DIRECT-ACTING COMPOUND ENGINE: Frank W. Jenkins, Brooklyn, N. Y. Filed Aug. 23, 1883.
287,291. WATCHMAN'S TIME-RECORDER: Albert M. Johnson, New Haven, Conn. Filed June 11, 1883.
287,293. CAR-BRAKE: Ernest Katzenmayer, Chillicothe, Ohio, assignor to the Mallinckrodt Brake Company, East St. Louis, Ill. Filed May 10, 1883.
287,296. RAILROAD-RAIL JOINT: Calvin M. Keefer, New Castle, Pa. Filed April 28, 1883.
287,374. CAR-TRUCK: Thomas J. Furbee, Bishop Creek, Cal. Filed July 28, 1883.
287,379. ROTARY STEAM-ENGINE: Lorenzo D. Hooper, Coffeyville, Kans. Filed March 10, 1881.
287,385. CAR-COUPLING: Conrad Luther, Scranton, Pa. Filed Sept. 4, 1883.
287,390. NUT-LOCK: Abram Reese, Pittsburgh, assignor of one-fourth to F. G. Kay, Allegheny City, Pa. Filed July 24, 1883.
287,395. CAR-BRAKE: William C. Travis, Gilman, Ill., assignor of one-half to William H. Francisco, Defiance, Ohio. Filed May 26, 1883.

BEARING DATE OCTOBER 30, 1883.

287,415. CAR-COUPLING: James Brown, Paine's Hollow, N. Y. Filed July 17, 1883.
287,418. DEVICE FOR CONNECTING PORTABLE RAILWAY-TRACKS: John J. Clarke, Patapo, Peru, assignor of one-half to A. W. Colwell, New York, N. Y. Filed Dec. 26, 1882.
287,446. ELECTRIC RAILWAY-SIGNAL: William W. Le Grande, Louisville, Ky., assignor to the National Electric Railway Signal Company, same place. Filed April 6, 1883.
287,455. CAR-COUPLING: James E. McMurtrey, Irvin Williams, and Frederick E. Okie, Burksville, Ky. Filed April 11, 1883.
287,466. ELECTRICAL CONNECTION FOR RAILWAY-SIGNALS: Thomas J. Pottinger, Louisville, Ky. Filed April 6, 1883.
287,483. CAR-COUPLING: E. H. Cady Tompkins, Glens Falls, N. Y. Filed Feb. 2, 1883.
287,486. TICKET-HOLDER: William B. Van Amringe, Providence, R. I. Filed March 12, 1883.
287,505. LOCOMOTIVE-BOILER: Charles B. Coventry, Chicago, Ill. Filed July 11, 1883.
287,528. CAR-REPLACER: Jesse T. Fosdick, Salamanca, N. Y., assignor to Charles W. Archer, Ludlow, Ky. Filed March 30, 1883.
287,572. CAR-AXLE BOX: Orestes Pagan, Philadelphia, Pa. Filed Nov. 13, 1882.

287,573. RAILWAY-RAIL BRACE: Michael R. Perkins, Portsmouth, N. H. Filed July 3, 1883.
287,583. RAILWAY-TRACK CLEARER: Geo. Royal, Davenport, Iowa. Filed April 27, 1883.
287,619. CAR-COUPLING: Wm. V. Brown and Thos. S. Poole, Arcadia, Nova Scotia, Canada. Filed April 10, 1883.
287,620. ATTACHMENT FOR STEAM-ENGINE GOVERNORS: William John Buchanan, Huntington, Ind. Filed Aug. 2, 1883.
287,629. CAR-WHEEL: David Connell, Wilmington, Del. Filed May 26, 1883.
287,638. CAR-SPRING: Nathan H. Davis, Philadelphia, Pa., assignor of one-third to Lewis C. Gratz, same place. Filed June 20, 1883.
287,650. DUMPING-CAR: William Fallon, Newburgh, N. Y. Filed June 12, 1883.
287,663. DUMPING-CAR: James T. Godwin, Norfolk, Va., assignor of one-half to Albert L. Woodworth, same place. Filed Sept. 6, 1883.
287,669. PISTON-PACKING: Le Vant O. Hall, Buchanan, Mich. Filed Aug. 10, 1883.
287,670. COMBUSTION DEVICE FOR STEAM-BOILER FURNACES: William Harman, Chicago, Ill. Filed Aug. 11, 1883.
287,674. GATE FOR RAILROAD-CROSSINGS: Eli J. Henkle, Baltimore, Md. Filed Jan. 4, 1883.
287,698. PLOW FOR UNLOADING CARS: Joseph McMullin, Casey, Iowa. Filed Aug. 24, 1883.
287,702. CAR-COUPLING: Robert T. Morrison, Jr., Medina, Ohio. Filed June 28, 1883.
287,732. RAILWAY-TRICYCLE: Henry K. Shanck, Dayton, Ohio, assignor of one-fourth to James A. Snell, same place. Filed March 31, 1883.
287,738. CAR-REPLACER: William Toombs, Logan, Utah. Filed June 23, 1883.
287,749. CAR-COUPLING: William H. White and Hiram F. Ruddell, Atlanta, Ga. Filed July 28, 1882.
287,759. CAR-COUPLING: Thomas Gates, Belfast, Tenn., assignor of one-half to H. C. Cannon and J. W. Adams, both of same place. Filed Aug. 24, 1883.
287,762. CAR-WHEEL-TRUEING MACHINE: James Henry Gowan, Chicago, Ill., assignor to William P. Black, same place. Filed Feb. 8, 1883.
287,771. CAR-COUPLING: Antone Muller, Mount Vernon, Ind., assignor of two-thirds to Henry Bastnagel and Henry Ritzert. Filed Sept. 1, 1883.

Fox's Improved Packing Chamber.

THIS invention, just out, consists of an inner part commonly defined *a gland*, and an outer sleeve. The former is provided with inclined planes or wedges concentrically arranged, which if pressed, will force together the packing into the box. An outer view of same, with box, is given in Fig. 1.

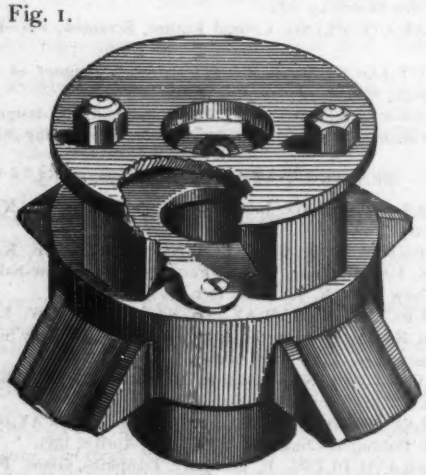


FIG. 1.

The casing or sleeve contains a series of square grooves, running radially from the center, and opening at both ends. Into these the packing fits, as do also the points of the wedges. A thin flat ring is fitted at the mouth of the box, fastened by screws, which confines the inner ends of the packing.

The Packing consists of parallel metallic blocks shown in Fig. 3. The method by which it is held in the box by the cap, is given in section on the left side of Fig. 2, and, on the right a *groove* is shown with the packing removed; the dotted lines *a*, *a*, point out the joints, which are absolutely tight, or proof against leakage. The letters *c*, *c*, Fig. 3, also describe the manner by which *the packing* of this box is effected; one of the segments being removed,

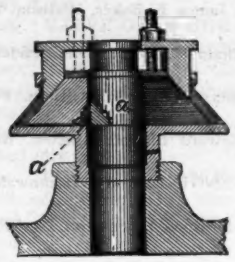


FIG. 2.

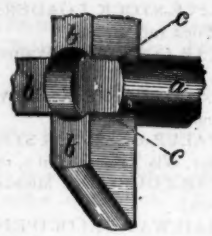


FIG. 3.

the narrow edges or surface lines are exposed. These will require to be as small as practicable in width, but sufficient to constitute flattened bearings for the series of blocks, which, it will be observed, do not pass by, but touch against each other; the surfaces needed not being enough, however, to prevent the tightening of the cap as the packing surface wears away.

An oil space (Fig. 2) is provided in the sleeve next to the packing; a necessary but uncommon provision.

In a chamber four inches diameter, there should be about four segments, and as the diameter increases, more. In operation, the entire pressure is brought upon the segments alone, and not upon the rod or shaft, thus producing *solely by contact*, a close joint, without the usual frictional loss of power or speed through pressure.

The segments are of anti-friction material, as Babbitt metal, of its various grades or qualities.

The device is well adapted to all valve stems, plungers, rolling shafts, and piston rods of all descriptions, where an adjustable packing is essential.

It is reasonably claimed that the use of this invention in hydraulic machinery will be attended with entire success, and to Railroad Engineers and Purchasing Agents it should here be said that for the modern locomotive, with its superior construction and adaptations, also for the modern stationary engine, of whatever type, nothing in the line of stuffing boxes can compare with this for simplicity or efficiency, none having provisions such as are now found in this Patent.

The inventor, Mr. Saml. Fox, of Toledo, O., will supply all necessary information further, as to cost of manufacture, if his circular is sent for and noticed.

Clingman's Nut Lock for Rail Joints.

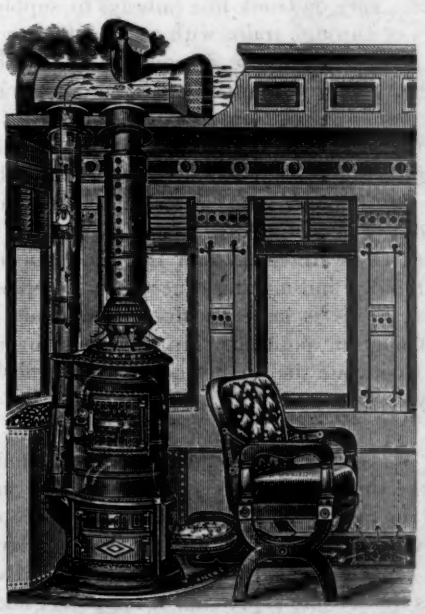
THIS patented invention, by J. L. Clingman, Cincinnati, is made of three pieces, either of which may be cut by machinery from any good quality of wrought iron of the requisite thickness. It is very simple and cheap to make, it is said to afford substantial and permanent security to the nuts, and to be, at the same time, capable of removal and reapplication, without damage to any of its parts. It is made in the following manner: A plate, with loops at

the middle, is applied to the bolts, and firmly secured by nuts against the side of the joint-plate. Next a locking-plate, having forked ends and notches, is applied to the said loop-plate. Said plates thus applied are then secured together by a split or bent key, passed through the loops and around both sides of the plate, thus firmly securing the locking-plate, which, by its forked ends fitting the sides of the nuts, is prevented from becoming loose. The lower prongs of the locking-plate are made longer than the upper ones, so that they may be tightly wedged between the angle of the nuts and the base of the joint-plate or rail, thus forming a brace between the nuts, securing thereby a lock which, the inventor claims, cannot be shaken or jarred loose.

Spear's Anti-Clinker Car Heater and Ventilator.

HEATERS for which the manufacturer claims that their use insures perfect ventilation, thorough heating, comfort and safety, call for special mention and detailed description. When the objects specified are accomplished, the difficult problem of heating cars as they ought to be heated, is solved. Practical readers, therefore, will follow with interest some particulars of the invention made by James Spear, Nos. 1014 and 1016, Market street, Philadelphia, which, we may add, has been tried, and is approved by very competent judges.

The principle of the invention is, that fresh air is taken in at the top of the car through the ventilator, passing down a pipe to the base of the stove around the heated cylinder and through a 4 x 6 pipe along the side of the car, escaping through registers between the seats, thus warming the feet of the passengers, thoroughly heating the car, and forcing the foul air through the opening at

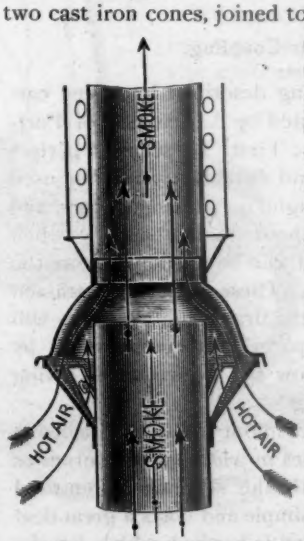


its top. A large volume of fresh air is admitted to the car through the ventilator on the roof, and distributed equally throughout the entire car, and persons sitting near the stove are as comfortable as those in any other portions of the car. In making the attachment from the heater to the tin pipe, a cast iron elbow is used, making a complete connection between the heater and hot air pipes.

The fire pot of the Spear heater is constructed in three sections, and is so arranged that any portion can easily be removed. From its peculiar shape and division, it should last a long time without burning out. It is easily repaired, and by replacing a few plates occasionally, lasts for years without renewing, There are safety latches applied to all the doors of the heater. These are readily opened when neceessary, and are positive locks to the door in case of accidents. Though cars containing this stove have been overturned in numerous cases, it has never been known to set fire to the car, or even to be moved out of its place. It is substantially constructed, thoroughly bolted together with strong iron rods, and firmly fastened to the car floor. The fire surface is large and so constructed as to insure a large amount of heat from the fuel consumed, which may be either hard or soft coal or coke.

The cuts illustrate Mr. Spear's Heat and Draft Regulator for Car Heaters, of the A and D pattern.

In cold weather, more heat is required than in mild weather, but as the draft of the stove is increased by the motion of the car, nearly as much heat is produced on a mild day as on a cold one. To prevent this, Mr. Spear has constructed a draft and heat regulator composed of two cast iron cones, joined together at their largest diameter. As shown in Fig. 1, the smoke pipe from the stove passes through the lower cone, and a sufficient distance into the upper one to leave an inch space between the pipe and the wall of the cone; the smoke pipe rests on the ledge of the upper one, all being firmly riveted together. The lower cone is supplied with a register. *When less heat* is required, the register is opened and a current of air rushes up through the opening into the smoke pipe, and is carried out through the roof of the car, thus checking the draft of the stove and causing less combustion of the fuel. When this regulator is open the fire will burn much slower, the fuel will last longer, and the stove require less attention. The passengers are relieved from the oppressive heat in mild weather, or any time during the winter when less heat is required. This mode of ventilation will be found to be preferable to that of opening the registers in the roof of the car, as in that case passengers are annoyed by cold air falling on their heads. The objects thus accomplished are: passengers are made more comfortable, a car can be heated when the temperature is at zero, the heat is controlled in mild weather, fire is retained in the stove a much longer time without attention, less fuel is consumed, and the heater itself will last longer. This improvement can be applied to all the Spear stoves now in use, at a trifling expense.



A kindred appliance is the Anti-Clinker Grate, the object of which is to remove the ashes and clinkers from the fire-pot without dropping the fire out. This can be done with less trouble than it takes to rake the old kind of stoves, and a continuous fire be kept going always fresh on the grate. By this means the entire surface of the

stove can always be relied on for heat; but in other stoves, when the grate surface becomes covered with clinkers and the cylinder half filled with ashes and clinkers, only the upper surface will afford heat, thus very often resulting in the overheating and ruining of the stove. With this improved grate, the base of the stove is always hot, and there is a bottom as well as a top view of the fire, whereas in all other stoves the fire can only be seen from the top. With Mr. Spear's improvement it can always be seen when the fire requires raking. By opening the small door in the base, communication is made with the lower portion of the fire, the person in charge can readily see when the fire needs raking, and all clinkers and ashes can easily be removed from the surface of the grate by the use of a simple poker.

We learn that the use of the Spear heater has never been attended with accident, such as the end of the car blowing out, water or steam escaping into it, or a passenger being injured in any way from its presence. Its safety under the extreme test of the overturning of a car is referred to at its proper place in this article.

Mr. Spear is the sole patentee and manufacturer of his inventions.

Improved Car-Coupling.

THE objects of the following described improved car-coupling, invented and patented by A. Lenhart, of Portland, Or., Oct. 9th, 1883, are: First. To secure a perfect and complete coupling, safe and durable, that can be used on all rolling stock, either freight or passengers cars, and which will couple itself without human agency when brought together; and, second, can be uncoupled from the top or either side of the train. These objects are attained by the following mechanism: the drawhead, which we will call *a*, and bar are in two parts, attached together by means of a pin, so as to allow the drawhead to swing slightly to one side in coupling.

The drawhead has a flat face about five or six inches in depth and seven or eight inches in width, which serves as a buffer, thus doing away with the separate buffer used with the "Miller Coupler," is simple and costs a great deal less. One side of this drawhead is hooked, which, for the purpose of explaining, we will call the right side, and the left side has a tongue which enters the hook on the right side of drawhead *b*, as they meet, at the same time that the tongue or drawhead *b* enters the hook or drawhead *a*. A semicircular recess runs vertically through the center of the drawhead, into which fits a semicircular pin, held to its place, with its face at an oblique angle to the face of the drawhead, by a spring, and so as to turn till its face becomes parallel and flush with that of the drawhead. When the drawheads come together the recesses meet in the center and form a round hole, and the parts fitting in them, by coming together, form one round pin exactly fitting the aperture. This pin is the means which fastens the coupling, and by which it is uncoupled. In coupling, these two parts are pressed back by the drawheads as they come together, till their faces become parallel with those of the drawheads, and until they have met in their proper places, when they spring back to their original oblique angle, thus fastening the coupling so that it will never part, no matter from which direction the strain may come. The coupling is uncoupled by turning this pin till the faces of its parts become parallel and flush with the faces of the drawheads, when the connection will be entirely free. Each of the parts of this pin has a small crank on the lower end under the drawhead, and is connected by a rod to a bell-crank attached to the drawbar under the car, and from thence, by rods, to cranks on each side of the car, one of which cranks has a rod running to the top of all freight cars (passenger coaches need only one rod running to the platform). By turning one of these cranks from either side of the top of the train the coupling is uncoupled, and it may be uncoupled from either car, as the turning of one half turns the other. It may also be uncoupled though one side be broken or disconnected, or be only attached to a link-and-pin drawbar, as it may be. This coupling has advantages. It is durable and safe. It is far more practical and convenient than any now in use. It excels the best coupling, in not requiring a separate buffer, in being applied to all cars, in having the means of coupling and uncoupling concentrated in a single pin in the center, and by not requiring to be operated from both cars. One half of a train may be connected with link-and-pin, and the other half with this coupling. The engineer always has absolute control of his engine, as he can attach and detach it from his train, at will, while remaining in his cab. And lastly no slack is required to be given in order to uncouple.

Putnam's Railway Metallic Cross Tie and Trough.

MR. GEORGE L. PUTNAM, No. 952 Broadway, New York, has been granted a patent covering any kind of metallic tie with a depression in its upper surface, for the purpose of holding a trough. Its probable value appears from certain facts familiar to every railroad man.

It is customary on trunk line railways to supply the locomotives of through trains with water, while they are in motion. For this purpose a trough, a fourth to half a mile in length, is sunk into the ties between the rails. To place the trough in position, it is necessary to cut the ties so much that they offer but little protection against the spreading of the track. Moreover, every time that a locomotive is supplied with water, a quantity of it is swashed out of the trough on to the track, thus keeping the wooden ties water-soaked all the time, causing them to decay rapidly, and making it necessary to replace them very often. This is an expensive and difficult process, with the trough in position. Mr. Putnam's invention is designed to obviate the present necessity of renewing ties frequently,

HENRY W. GWINNER, who died by his own hand in this city, on the 19th ult., was a veteran business man, experienced in railway matters. From 1858 to 1880 he was in the service of the Pennsylvania Company. Mr. Gwinner was a capable, genial and popular man. His death, which was the terrible expression of temporary aberration of mind, is deeply deplored. He was born in Philadelphia about sixty years ago. A melancholy interest attends our business relations with him. About an hour before his death he signed a check in payment to the publishers for advertising, the last business act of his life.

SUSCRIBE for the AMERICAN RAILROAD JOURNAL.

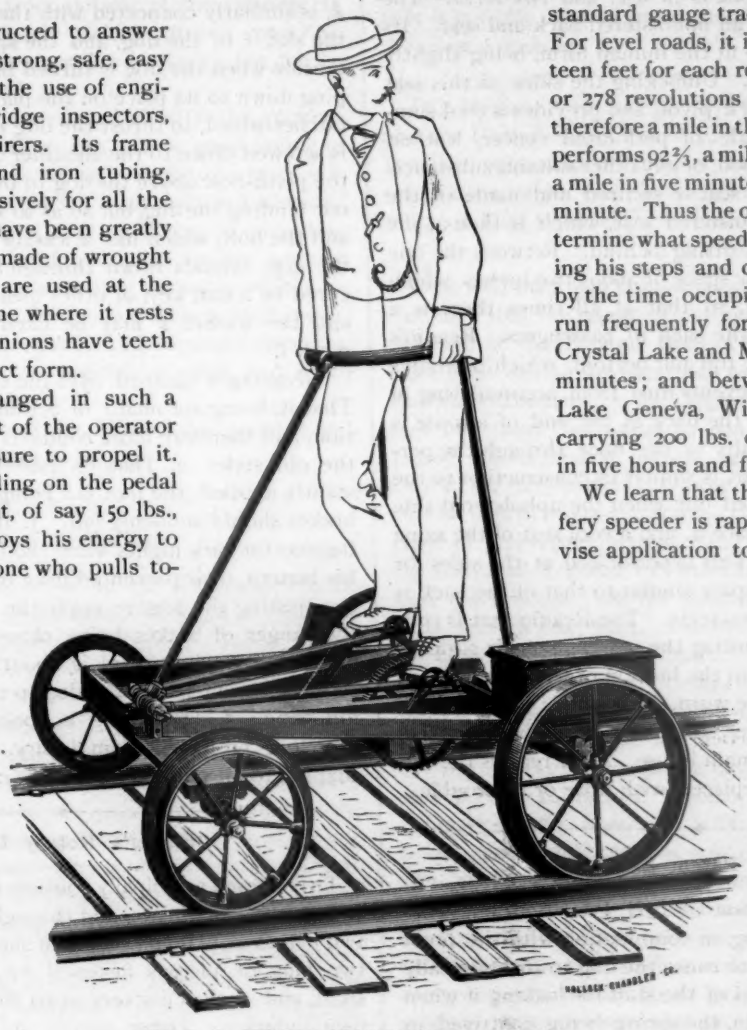
The T. B. Jeffery Railroad Velocipede or Speeder.

THIS contrivance was awarded the first premium, silver medal, at the National Exposition of Railway Appliances, held in Chicago, May 24 to June 23, 1883. It is manufactured by T. B. Jeffery, Nos. 38 and 40 South Canal street, Chicago.

The speeder is constructed to answer the demand for a light, strong, safe, easy running velocipede, for the use of engineers, road masters, bridge inspectors, and telegraph line repairers. Its frame is of selected maple and iron tubing, and steel is used exclusively for all the journals. The wheels have been greatly improved, and are now made of wrought iron. Friction rollers are used at the four corners of the frame where it rests on the axles, and the pinions have teeth cut by machine to perfect form.

The machine is arranged in such a manner that the weight of the operator is used in a great measure to propel it. Manifestly, a man standing on the pedal and allowing his weight, of say 150 lbs., to fall ten inches, employs his energy to better advantage than one who pulls toward him 150 lbs. for the same distance. It should be remembered, moreover, that in the employment of the crank, power can be advantageously used only during a small portion of its revolution, that is when it is at right angles to the direction in which the force is applied. When the crank is at or near the dead centers, much of the power is expended on the axle, and only a small amount of force transmitted to the driving wheels. If then the work is done by standing on a lever and allowing the weight of the body to fall to operate it, no power is expended if the lever fails to descend, and little if the weight falls slowly as it does at first, and toward the end of the stroke. This is not the case if the power is applied by straining the muscles, pulling on a crank either directly or through an intermediate lever. The strength can rapidly be exhausted by pulling, even if the machine fails to move at all. In the Jeffery speeder the position of the operator is such that he can look out well forward or backward for approaching trains, can see clearly the whole of the road, can change his position on the platform and manner of working so as to afford a partial rest while running, and can leave instantly on an emergency without being entangled with any of the gearing or appliances. The arrangement is such, that no danger will occur if the brake is suddenly applied, or if the operator fails to lean the right way when turning a curve; and the gearing is so arranged that the operator can run the machine backward or forward without danger of derailment. A quantity of supplies, and one or two persons beside the operator, can be carried conveniently on the platform, and assist in propelling if they desire. The speeder is kept in stock for standard gauge tracks, 4 feet 8½ inches. For level roads, it is made to travel nineteen feet for each revolution of the crank, or 278 revolutions per mile. In running therefore a mile in three minutes, the crank performs 92⅔, a mile in four minutes, 69½, a mile in five minutes, 55⅗ revolutions per minute. Thus the operator can readily determine what speed he is running by counting his steps and comparing the number by the time occupied. The car has been run frequently for eight miles, between Crystal Lake and McHenry, Ill., in twenty minutes; and between Chicago, Ill., and Lake Geneva, Wis., seventy-two miles, carrying 200 lbs. of Sunday newspapers, in five hours and forty-five minutes.

We learn that the demand for the Jeffery speeder is rapidly increasing, and advise application to the manufacturer for further information.



THE T. B. JEFFERY VELOCIPEDE OR SPEEDER.

Kling's Car-Coupling.

THE car-coupling invented and patented by Isaac Kling, Louisville, Kentucky, is commended by its simplicity, durability, and trifling cost. Moreover, while it works automatically, no change need be made in the draw-bar, and cars of unequal height can be coupled by its means.

Mr. Kling's invention consists, mainly, in an automatic coupling, having a shouldered coupling-pin, which is applied to a T-head spring actuated guide; also, in a coupling-link which is provided with a block of metal, rubber, or wood end filling and perforated clamping plates.

Details can be procured from the inventor.

THE commendations of railroad men and experts as to the efficiency of the McLeod Automatic Air Signal are emphasized by the testimony of the Massachusetts Railroad Commissioners, who say of it in an official report, that it is "an ingenious and inexpensive device, by which the coming of a train is announced far in advance, both by visible and audible signs." We direct attention to the advertisement of the manufacturers, which appears in this issue of the JOURNAL.

SUSCRIBE for the AMERICAN RAILROAD JOURNAL.

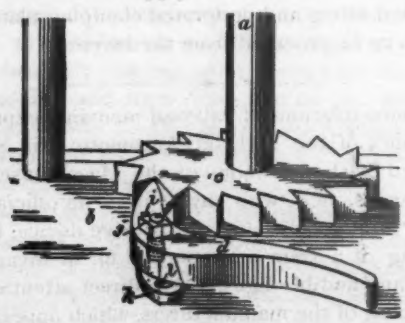
The Readio Improved Car Seat.

THE inventor of this recent improvement in car seats is Arthur Readio, Pawtucket, Rhode Island.

His car seat is a reversible summer and winter seat, and its use prevents the necessity of storing the summer seat while the winter one is in use, and *vice versa*. The winter seat consists of an upholstered back and seat. Its back is so shaped as to fit the human form, being slightly convexed in the center. Unlocking the sides of this seat causes it to reverse on a pivot, and provides a cool summer one, which is made of perforated veneer, leather, rattan, cane, split bamboo, or any other suitable substance. By locking again, the seat is secured and made of the same shape as the upholstered seat, which is then at the back, facing the person sitting behind. Between the one back and the other is a space of about two inches, which serves as an air space, so that at all times there is a current of fresh air at the back of passengers. Readio's seat is perforated at the top and bottom, which promotes ventilation, and also prevents dust from accumulating in the air space, for when the back at the end of a route is turned over, the dust falls to the floor through the perforated bottom. The seat is similar in construction to the back, only that it is lifted out when the upholstered side is up. Turn it over, replace it, and a cool seat of the same material is presented. This is perforated at the sides for ventilation, and an air space similar to that of the back is provided between the two seats. The Readio seat is concave in form, thus preventing the passenger from slipping out at any irregularity in the motion of the cars. When the upholstered parts are worn, by a simple device which holds the parts together, they can be easily removed, while the other parts remain in use. After repairs the upholstered parts can be replaced with little or no trouble.

The Pitard Patent Brake Dog.

THIS patented invention of J. H. Pitard, Mobile, Alabama, consists of a spring, in combination with the pivot of a car brake staff dog, to cause the dog to automatically engage the ratchet-wheel of the staff for locking it when set to hold the brakes on, the spring being contrived in the eye of the dog, through which its pivot-bolt passes, so as to be protected from injury, and also to be concealed from view. The arrangement provides a means for causing the dog to engage quickly, and at any time that the staff may be turned to apply the brakes.



The figure is a perspective view of part of a car platform and brake-staff, with this improved spring-dog contrivance.

The staff *a* of the brake is arranged on the platform *b*, and provided with a ratchet-wheel *c*, in the usual manner, with which a dog *d*, is also employed, as in the common way, except that a spring *e*, is coiled around the pivot-bolt *f*, in the part which extends through the pivot-eye of the dog, one end of which spring is connected to the bolt by dropping down a slot *g*, in said bolt, and the other end *h*, is similarly connected with the dog by dropping down the slot *i* in the dog, and the spring is arranged to have tension when the dog is turned into the position for dropping down to its place on the platform by the side of the ratchet-wheel, to thrust the dog into the teeth. A nut *j* is screwed down to the shoulder of the screw-threads on the pivot-bolt above the dog to bind fast on the bolt without binding the dog, but so as to keep the dog in its place, and the bolt, which has a washer *k*, for a pivot-support of the dog, extends down through the platform, and is secured by a nut, key, or other means, as may be preferred, and the washer *k* may be fixed to the platform *g* by a screw *l*.

Advantages claimed over the old style of dog are: 1. That it, being automatic in action, is quicker in application, and therefore more conducive to public safety than the old style. 2. That on passenger trains it can be instantly applied (the foot not being needed) in case the air brakes should suddenly fail. 3. It is particularly advantageous on dark nights when the brakeman may not have his lantern, or is prevented from other causes from quickly adjusting the dog to apply the brakes. 4. It obviates the danger of brakes being thrown off by a sudden jar, when the ratchet-wheel is about worn out, as in such case the spring causes the dog to catch in the next tooth following. 5. The spring is concealed from view, and is therefore protected from injury. The patent brake is adapted to all railroad and street cars.

Shaler's Rotary Engine.

THIS engine principally consists of two cylinders bolted to a suitable bed-plate, and through the centers of these two cylinders extends the main shaft, or axle. There are two fans or pistons fastened to opposite sides of this shaft, and such a distance apart that each revolves in its own cylinder. Other points of construction are two slides operated by cam movement, and levers which slip out and in directly behind the fans above-mentioned, through a slot in the circumferences, and through the radii of each cylinder, so that a steam-tight partition is formed in each cylinder alternately behind the fans. It will be seen from this construction that the steam pressure will be required to carry each fan half-way round in order to make one revolution, and the rest of the revolution, with time deducted for the raising of the slide, can be used for the expansive power of the steam, which is calculated to be expended before the slide starts to rise, so that the power required to raise the slides is very small. The engine is supplied with a perfect balance cut-off valve, which changes the steam first to one cylinder and then the other. There are two steam chests situated on the sides of each cylinder, for the purpose of reversing the engine. Within these chests are two common slide valves, which simply change the supply and exhaust ports from one side of the slides to the other when the engine is required to be reversed. By this construction it will be understood that the exhaust ports are always open

to the air, and that the engine can be reversed under a full head of steam. The interior surfaces of the cylinders are turned slightly tapering toward their outer circumferences, and the fans revolving inside are supplied with tapering packing plates, of brass or any suitable metal, and secured with set screws, which can be reached through slide openings from outside of the cylinder, so that the fans can be properly packed without removing the cylinder heads. Every portion of the engine can be perfectly and easily packed.

The engine described, as compared with the reciprocating engine, is designed to run with a great saving of steam and fuel. Its inventor believes it to be especially adapted to any purpose requiring a compact and powerful engine, and that it may fill the place of any reciprocating engine, with economy. It might be also applied to road vehicles and street cars, by attaching the drive-wheels directly to the main shaft. A vehicle thus provided, its inventor claims, could run equally well in either direction, stop and start at any point, run fast or slow, and be of comparatively light weight.

Clarence A. Shaler, Fox Lake, Wis., is the inventor and patentee of the Shaler Rotary Engine.

A New Hand Car.

THE hand car manufactured by the Kalamazoo R. R. Velocipede Company, Kalamazoo, Michigan, is recommended as being very speedy and durable. Some peculiarities in its construction merit particular mention. The cranks are set obliquely to each other, doing away with dead centers and economizing the power used. The trussed levers pass each other to their pivots, and so are made to apply the power to both sides of the spur gear, thereby securing additional leverage. The gas-pipe frame or standard, is light, strong and durable, and occupies but little space. An S shaped brake works on both wheels at the same time. It is very strong, and is instantaneously operated by simply stepping on the pedal. The Kalamazoo R. R. Velocipede Co's new hand cars are made in two sizes: the section car, weighing 450 pounds, and amply strong for ordinary section work, and the telegraph car, weighing about 300 pounds, which is easily handled by two men.

The Burton Stock Car Co.

THE Burton Stock Car Co., of Boston, Mass., have just completed ten cars, making twenty-three which they now have running. These cars give great satisfaction to both shippers and receivers of live stock, and are worthy of commendation on account of the prevention of suffering to the cattle as well as saving of weight and improvement in quality and healthfulness of the beef. The Burton Stock Car Co. have made arrangements with two leading Trunk lines to run their Improved Stock Cars. These cars are in great demand by stock shippers, and all the cars they have are now engaged by shippers for five weeks in advance. Shippers have written that they would pay $5 per head for the use of this car for long distances in shipping stock, rather than ship in the ordinary stock car.

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MEXICAN NOTES.

IT has been shown by statistics of railway travel in the United States, which, in spite of all that has been said to the contrary, is one of the safest of countries in this respect, that the proportion of accidents to travelers is much less than to persons about their ordinary affairs, so that it is really safer to travel than to stay at home!—*The Mexican Financier*.

THE Mexican Central line between the city of Mexico and the United States will be completed by March 1, 1884. It will be opened to traffic for some time before the official celebration of its completion, which will probably take place on May 5, the Mexican national holiday.

OUR well-informed contemporary, *The Mexican Financier*, says that the report of the general inspection of the railways of the Federal District gives an account of the work done during the fiscal year of 1882-3. The District-Railways Company, on its Tlalpam line, constructed a direct line from San Lucas to San Antonio, a distance of 12,665 meters, and a branch between Churubusco and Coyoacan, 3,227 meters. On the Santa María line the circuit of Ciprés was constructed, 1,052 meters, with a double track of fifty-seven meters. On the Peralvillo line, from the corner of Tepozan to Peralvillo, 1,052 meters of track were constructed. On the Dolores line a double track of 1,440 meters was built. On the La Piedad line double track of 651 meters was built. On the Mixcoac line a branch was built to the hacienda of Castañeda, 398 meters. On the Guadalupe line a double track of 660 meters was built, and in Guadalupe 248 meters of track were added. On the Atzcapotzalco line a double track between Tlaxpana and the Calzada of Patolco, 1,319 meters, was built. Altogether, the company built 22,247 meters of new broad-gauge track, and has now in operation 125,379 meters of track. The line between Atzcapotzalco and Tlalnepantla is now under construction. The company received during the year twenty-three new first-class coaches, twelve second-class and ten platform cars. The company owns on its broad-gauge system 106 first-class coaches, sixty-one second-class, forty-two platform cars, three box cars, and twenty funeral cars. The company owns 1,400 mules and 500 horses. No new track has been added to the narrow-gauge system of the company, which has an extent of 20,202 meters. Eight new first-class narrow-gauge cars were received, making a total number of thirty owned by the company, and seventeen platform cars. The number of passengers carried by the company in the course of the year was 9,134,868. On the Baths-Circuit Railway, 600 meters of narrow-gauge track were constructed, to complete the circuit between the Alberca Pane baths and the Ciudadela. The total length of the circuit is 6,000 meters. The company owns twenty-three passenger cars, thirteen platform cars, two box cars, and eighty mules. The work on the Central Table-land Railway (broad-gauge) began at the gate of San Antonio Abad on April 17, last, and up to date of the report, a length of 3,000 meters of embankment, and 1,400 meters of cutting had been constructed.

A street railway is to be built in Monterey, Mexico, by R. H. Tilotson.

THE New York and New England Railroad has recently adopted for its passenger locomotives a heavy, deep-toned whistle, which is easily distinguished from the shrill whistle of the freight engines, and which is designed to be another factor of safety for travel, as all trains and track hands know that this whistle denotes a passenger train, and are thus warned to have switches closed and tracks clear for its passage.

THE Brotherhood of Locomotive Engineers has nearly thirteen thousand members. Its financial strength is evidenced in the fact that during the year of its existence recently ended, it paid out $118,233.72, in claims to representatives of deceased members.

THE McLeod Air Railroad Signal in use on the Old Colony Railroad "is working perfectly and with entire satisfaction," as stated in a report seen by our representative.

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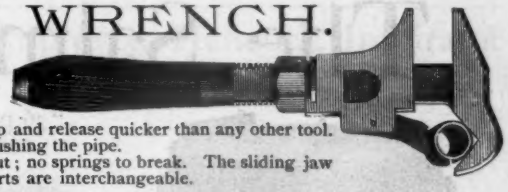

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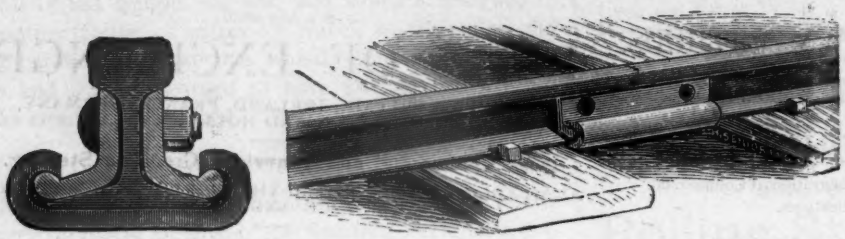

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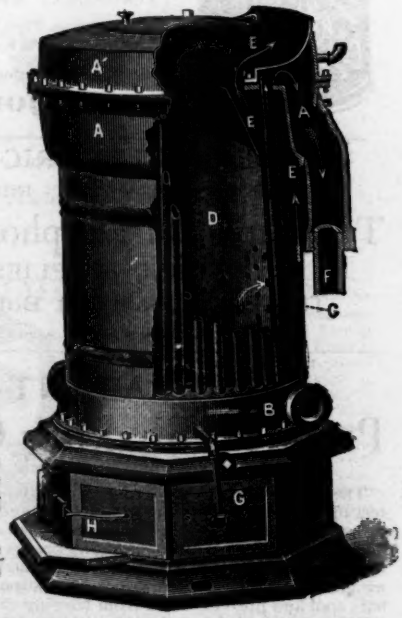

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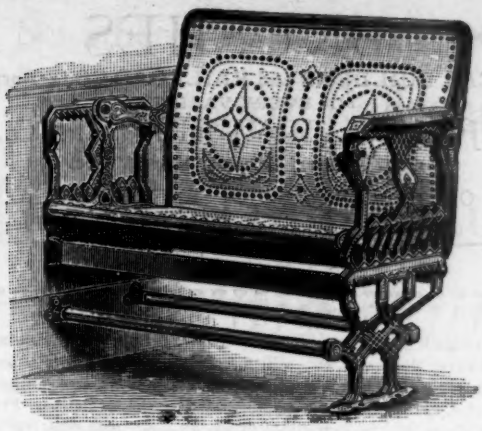

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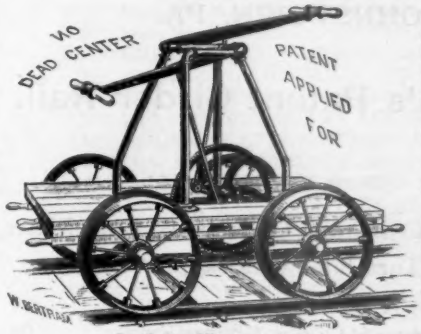

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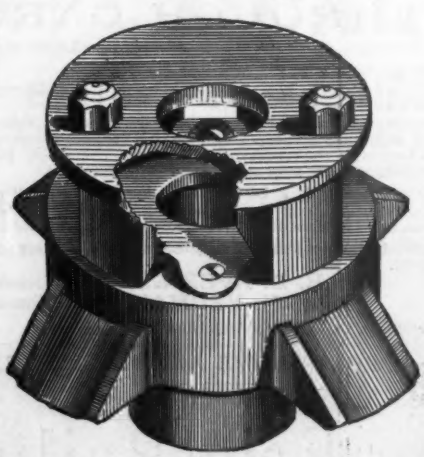

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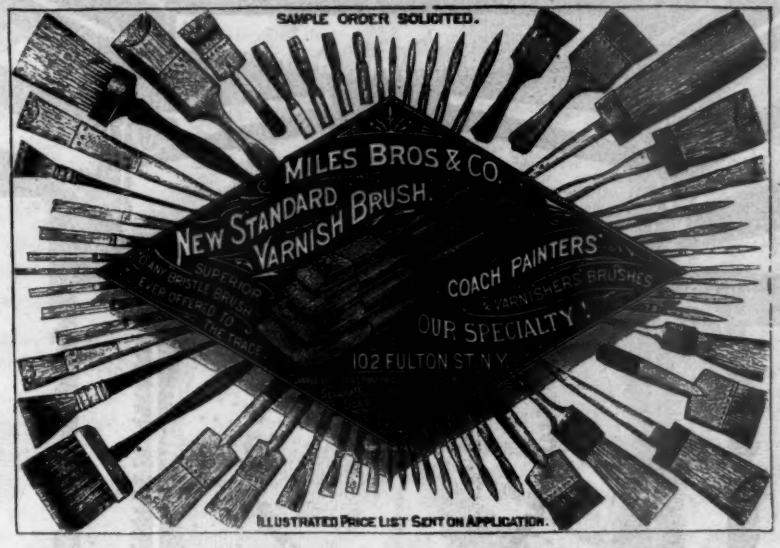
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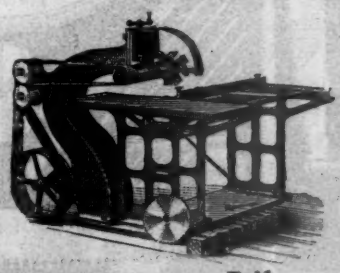

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